

THE ANTIQUE RADIO GAZETTE



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NO. 1



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December 30	November 15

Deadline for Material

We are working to expand this to six (6) issues per year.

THE ANTIQUE RADIO CLUB OF AMERICA, INC.

Regardless of the month in which you joined ARCA, renewal dues are payable in January.

ONE YEAR dues — **\$12.00 U.S.** in USA/Canada/Mexico, **\$14.00 U.S.** in all other countries

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New membership card will be mailed to you with next Gazette following receipt of payment.

President's Page

So much has happened since we last talked. An entire war has been fought and won, and another season is showing its face.

Of tremendous concern to me, and I am sure many of you, was the "War in the Gulf". It would have made for a very difficult season to kick off all of the 1991 radio meets had we still been at war, and even worse had many of our troop's lives been in danger.

Thanks to the technology of electronic warfare, we have survived this great tragedy with little cost of life. I would like to refer to this tremendous accomplishment as the "Edison Effect". War will never be conducted in the same manner again. I need not refer to all of the electronic equipment that we all saw perform. Probably the most important element of all of this was radio. No TRF sets here. All hi-speed digital direct to set com-

munications equipment. Can you imagine the stuff collectors will be looking for 30 to 40 years from now. Hi-tech radios from the 90's—better stash some of it now and do not forget the original shipping crates!!

I want to say thanks to all of our troops and I am sure we have some members in the armed forces—both reservist and regular.

Now our full attention can turn to the events of the season and our upcoming ARCA '91 convention, with our host the Mid-Atlantic Antique Radio Club. This meet is cranking up to speed and is destined to be the largest yet for ARCA. If you have never attended a major convention, treat yourself and put this one on your calendar—you won't be sorry!

Wishing everyone a very pleasant spring and a safe trip to Baltimore.

As many of you recall in the Fall issue, Vol. 18, No. 3, a challenge was given to you to voice the pros and cons of a fixed vs. mobile ARCA convention. In the same issue, several of your letters were printed. I received many comments at our directors meeting and from members via phone and in person. The results were a draw. However, I promised each an answer and a

best possible solution. We now have the best of both worlds. There will be four fixed meets and our regular convention each year in a different location. The great thing about the fixed location is if you cannot make one of the meets, your equipment will be taken on consignment from one meet to the next. Watch for details.

AREA 91 June 13 - 16 Baltimore
MUSEUM MEET July 6 - Huntington, WV
MUSEUM MEET October 5 - Huntington, WV

November 29, 1990

ANTIQUE RADIO CLUB
OF AMERICA
4204 Thorn Apple Lane
Charleston, West Virginia 25312
USA

Att. Mr. Lloyd McIntyre
— President —

Dear President

It was a pleasure to meet you last September/90, during The 29th Annual Conference of A.W.A. in Rochester, NY (Marriott Hotel).

Our first meeting at The "Flea Market" was memorable, and I had a chance to see beautiful things of

your collection; to meet people from different places, etc.

Enclosed, I'm sending a Membership Application that you gave to me. I hope to become a Membership of your Club, and to receive more informations about Radios.

I have a collection of wireless equipment (a private Museum here in Sao Paulo/Brasil).

Thank you very much for your attention with me.

Success always for you, your family, and the Club!

Best Regards,
Edison De Freitas
Sao Paulo
EF-164/90-R



EGYPTIAN PYRAMIDS AND THE BELL-SHAPED CURVE

by *Frederrick Butterfield*

As we approach the next century perhaps I should reveal some of what years of study has revealed to me. Though it may be considered esoteric information by some I consider members of A.R.C.A. to be above average intelligence and, I hope, not adverse to new or different ideas. Real scientists do not scoff at what they do not understand. They investigate and prove or disprove contentions.

I have concluded (and all my conclusions are concerned only with "our" solar system. Since no Earth scientist has taken any of his or her measuring instruments outside the solar system all conclusions about space beyond the solar system are mere speculations, not fact) that the solar system (at least the sun) is vibrating at a rate that is revealed by the wavelength/frequency formula used with electromagnetic radiation. Most "radio-men" have used this formula, at least when a student.

$$\begin{array}{lcl} X & = & \frac{300,000,000}{\text{cycles per second}} \\ \text{(in meters)} & & \end{array}$$

The 300,000, is a
000

constant of vibration and of time. Our sun is vibrating at a rate of 300,000,000 times per second. That is what that formula means. The sun is generating electromagnetic fields, and yes, even time. Time outside "our" solar system could be completely different. Each star, I think, generates its own E-M field, and its own time.

Many scientists are familiar with

the bell-shaped curve. This is a symmetrical curve which rises, at first slowly, then steeply, then levels off at the top, only to reverse the procedure on the way down. This curve, or graph, is found throughout nature. I believe scientists of ancient civilizations, though they may have expressed certain concepts differently, were much familiar with mathematics inherent in nature. The Great Pyramid of Egypt rises to 450 feet and has a flattened top. Some book writers state that the top of the pyramid or peak "is missing" and it should be 481 feet high. This shows that they do not understand what the pyramid is teaching. The square root of 10 is 3.16 (227766). The ancient Egyptians, though knowing better, even wrote down that the value of pi was 3.16. This is because they considered 10 to be the number of the sun, which they worshiped. The last 31.6 feet of the Great Pyramid were not built on purpose. (31.6 is the V1000). The pyramid is a rough approximation of the bell-shaped curve. Our human lives (bodies) grow as the bell-shaped curve. At age 31.6 years we are at the top of the bell, but then comes the turn-around; our bodies, and even our outlook begins to change. The spiritual nature begins to overcome the physical nature. In my decades of experience I have found that the human intake of food should also follow the bell-shaped curve.

That is, the volume of food we eat should depend upon our age. Daily intake can slowly increase previous to age 32, but, for health's sake, it should slowly decrease. Even if one keeps to the habit of three meals a day (which I abandoned) the meals should be

smaller as we leave 32 behind. It is not only our radio gear that needs care!

I have concluded that the "constant" pi, an irrational or transcendental number (dictionary calls it both) has the numerical value V10 (3.16+) at the vicinity of "our" sun, has the value 3.14159+ on the surface of the Earth, and has an unknown value elsewhere. You ask, how is this possible? I answer, because space is warped or bent in varying degrees, depending on the nature and mass of physical bodies.

I have found out many things simply by studying numbers, constants of nature, and the relationship between them, as I believe the ancient peoples did without "higher" math. The above gives you something to think about. We have been told by physicists that all matter including ourselves, is electronic and mostly, what they call, "empty space". I think we are more than only what physicists understand.

I do have a question for preachers who say man is God's greatest creation: How come God made man's lifetime "three score and ten", whereas we see that some

trees live for 5,000 years? (Just the facts, please).

One more thing. Doom and gloom writers upon discovering entrophy have predicted that, because of entrophy, the universe would grow colder and colder, run down, and everything die. Nothing exists without its opposite. The opposite of entrophy is life. Life is a heat-generating thing. You cannot discuss entrophy in isolation, and those that deny the fact of opposites are fooling themselves and maybe others.

Electronics is indeed a wide field.

Frederick Butterfield

Rt. 3, Box 394

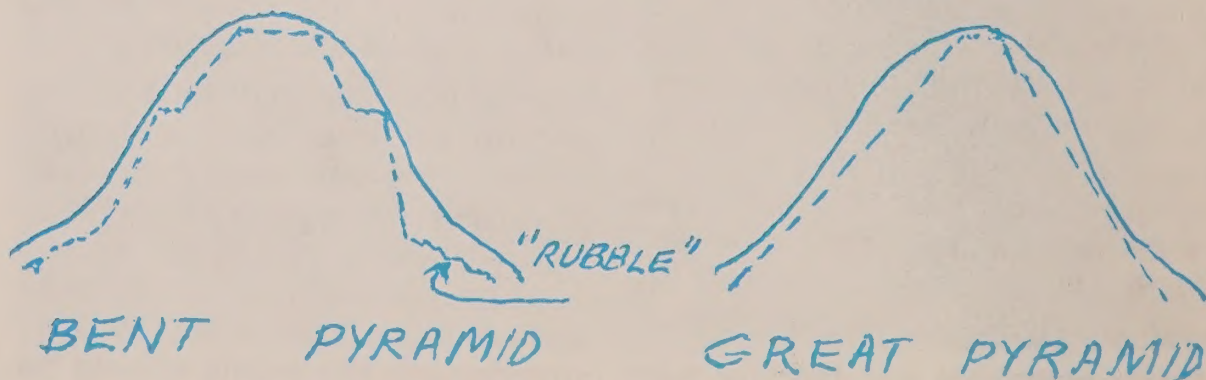
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BENT PYRAMID

GREAT PYRAMID

"RUBBLE"

The Bent Pyramid was not "an engineering mistake" as has been written if you compare it with the bell-shaped curve it closely follows. Even the "rubble" is part of the design.



TRANSISTOR TOPICS

by Ross Smith

THE FIRST HEATH TRANSISTOR RADIO KIT — MODEL XR-1

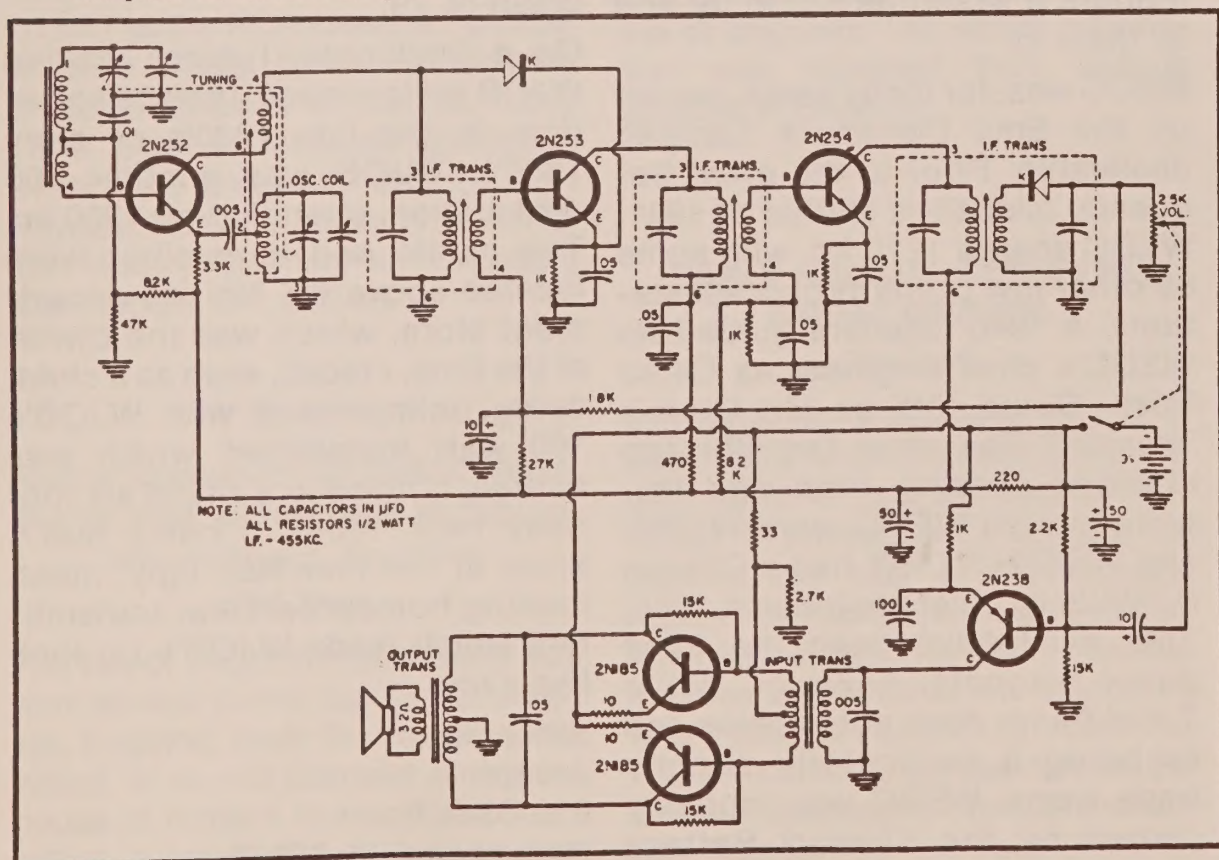
The first Heath Transistor Radio was described as a "carry anywhere" portable using six Texas Instrument transistors and two diodes. The set has good sensitivity and selectivity plus superior tone quality from a 4" by 6" oval speaker. The cabinet is made of unbreakable plastic with a "formed-in" handle for carrying and is gray with gold trim. It measures 9" long by 8" high and 3 3/4" deep and sold for \$34.95 less batteries.

The XR-1 was designed in 1957 and first appeared in the 1958 model year Heathkit Catalog. Component parts in our set carry a December, 1957 code date.



The set is powered by six size "D" cells for a battery life of up to 1,000 hours. Sockets are provided for the plug-in transistors. A standard open plate variable capacitor is used for tuning. The push-pull audio circuit uses two audio transformers.

Complete schematic diagram of the Heath transistorized superheterodyne receiver.



The XR-1 was billed as equal to the finest portable transistor radio you could buy at a price less than some of the small novelty sets of the day. Quoting from the 1958 catalog: "Heath engineers set out to develop a 'universal' AM radio, suitable for use anywhere. Their objective was a portable that would be as much 'at home' inside as it is outside, and would feature top quality components for high performance and long service life." In our opinion, their objectives were met. My wife has used our XR-1 daily for 32 years with no further attention than necessary battery replacement.

The same chassis was offered in a later 1958 catalog with a two-tone blue cabinet having a pull-out carrying handle. This is model XR-1P with a reduced price of \$29.95. Also, Model XR-1L with a leather case was priced at \$34.95. The leather case was also available separately to fit any of these models at \$6.95. I am sure that Heathkit transistor sets will become desirable collectors items in the very near future.

Pictures courtesy of CTS-Turner Museum, by Joe Carlson.

Catalog information and schematic courtesy of Heath Co.

LETTERS

Thanks to Paul Crum for a most interesting article on his experiences at station WEDC in Chicago. Mr. Crum (delicately?) omitted names from his recollection, so, I thought it would be fun to try and fill them in.

WEDC was, for many years, owned by the Emil Denmark Cadillac dealership. Prior to the great frequency allocation shuffle of 1941, WEDC shared 1210 kc. with some 80 other low power broadcast stations. A 1940 listeners guide lists WEDC's chief engineer as Caleb Frisk. Could this be Mr. Crum's 'mentor'? The other two Chicago stations sharing time and frequency with WEDC were WCRW and WSBC. WCRW had a Clinton R. White as chief engineer in 1940. This must have been the toilet paper magnate; however, White Toilet Paper does not impress one as being a particularly punchy trade name. WSBC was probably owned by the Stewart Battery

Company which was located in the River West industrial district of Chicago. Stewart was listed as 'still alive' in 1925 and probably followed most of the 1920's radio manufacturers to oblivion in the crash of '29.

On a final note, I recall visiting WJOB in Hammond, Indiana sometime in the late 1930's or early 1940's. WJOB was another 100 watt station, operating on 1200 kc. The studio and transmitter were located above the Milikan department store, which was the owner at the time. I recall, even as a child, being unimpressed with WJOB's 100 watt transmitter, which was entirely housed in a single six foot relay rack. Most of hams that I knew at the time had ugly, mean looking homebrew 1 kw. transmitters which made WJOB's rig look like a toy.

Sincerely,
Joseph N. Mente
916 Olive Road
Homewood, Ill. 60430

THE REFERENCE LIBRARY

Jim Troe

This month we have several requests for help.

Ken Kelly writes that he has a cathedral radio marked Camden Radio, Model 700, Serial 100762. When the label inside the cabinet came off, Ken held it up to the light and noticed that an underlying label reads Clarion Model AC-70, Serial 104147. Does anyone know the characteristics of the speaker, since it needs to be replaced? Ken can be reached at 315 Jefferson Street, Apt. B, Media, PA 19063

Frederick Butterfield is looking for information on a Gonset CAA Communicator Transmitter/Receiver. It has 16 tubes and has two power supplies. He can be reached at Rt. 3, Box 394, Williamstown, NJ 08094

Frederick is also looking for information, as is Elliot Sivowitch at the Smithsonian, on the RCA Program Amplifier Model 84A. This was also known as the RCA General Purpose Amplifier Model MI4224. The tube lineup (5 tubes) is 80, 89, 89, 1603, 1603. Elliot is Museum Specialist, Division of Electricity and Modern Physics, National Museum of American History, Smithsonian Institution, Washington, DC, 20560.

Another Museum for the Radio Collector

NATIONAL WIRELESS MUSEUM Isle of Wight, England

JIM Troe

The Isle of Wight is a short ferry ride from several towns near Southampton, England. Near the center of the Island, in an old Elizabethan manor house at Arreton Manor, is an interesting museum of early English wire-

less and television history. The museum has been there since 1970 and continues to grow with donations of radio artifacts, magazines, QSL cards, books and catalogs. It can be reached by car or bus (only run in the summer) from the town of Newport. The manor is open from April thru October, 10 a.m. to 6 p.m. Monday thru Saturday, and from 2 p.m. to 6 p.m. on Sundays. In addition to the equipment on display there is much in storage and in restoration by a volunteer staff. Equipment on display is rotated.

The museum includes a large collection of crystal sets from 1911, a key collection, early novelty sets, a tube collection starting with in the WW1 timeframe, battery and early ac radios, testing equipment, early components for the home builder, early televisions, loudspeakers, and documentation of all types.

I have not visited the museum yet, but hope to do so when it opens next spring. I just recently heard of it on a trip to England. The above information was obtained from various sources in England.

EARLY BROADCASTING IN GREAT BRITAIN

Jim Troe

Broadcasting in England started in early 1920 when the Marconi Company built a special station from which it transmitted programs, to support the sale of their crystal radios. The Marconi company started up a second station in 1921. This was followed by five other manufacturers who started operating stations. These six companies then formed the British Broadcasting Company, which was licensed by the Post Office in

January 1923. To finance operation, each purchaser of a crystal radio was required to obtain a receiving license for 10 shillings, when the set was purchased. Half of the fee was used to finance the BBC. All sets manufactured from 1922 until mid 1924 had to be tested and approved by the government. Approved sets were required to have a BBC label attached which stated that the set was "Type Approved by the Postmaster General". But what about the home constructor? During a short period, October 1923 to July 1924, a home constructor was required to obtain a constructors license for 15 shillings, and affix the appropriate licensing information to his home constructed set. These little gems of history may help some of you English set collectors to date your finds.

THE EARLY RADIO HISTORY OF NORTHERN NEW JERSEY

part 3

In the summer, 1990 issue we covered Radio Frequency Laboratories, (RFL), and in the fall, 1990 issue, Aircraft Radio Corporation, as printed in June 1950 in *The Citizen*, a Boonton, New Jersey newspaper. Ed Weed was the author. He has given us permission to reprint the series. We continue the story with:

BALLENTINE LABORATORIES

During this time many other changes were made. RFL had sold all of its patents to the Radio Corporation of America and had executed license agreements with this organization, with the American Telephone & Telegraph Company and with the Hazeltine Corporation, to sell radio transmitters and receivers for aircraft. In 1929 Stuart Ballantine and two other

stockholders of RFL formed a new corporation for the continuation of electronic research and development work operating under the name of the Boonton Research Corporation. This corporation continued until 1932 when it was dissolved following the sale of important inventions in vacuum tubes and associated equipment. All of the assets of this corporation, laboratory buildings, apparatus, land and tools were acquired by Mr. Ballentine who organized in 1932 the present Ballentine Laboratories Inc. for the purpose of carrying on the same type of activity engaged in by the original corporation.

Following a period of depression, during which it was necessary to build up the business and develop new inventions and devices, Ballentine Laboratories marketed some new precision measuring equipment which is still being manufactured. The laboratories worked in cooperation with the Navy in the development of highly confidential equipment and, at its own expense, developed the first successful throat microphone to be used by the Army Air Corps. After a long period of testing, the instrument was finally standardized by the Army and many thousand were manufactured for the Air Corps.

These developments were chiefly the result of Mr. Ballantine's work as is also true of many of the earlier developments processed in his own laboratory or in its predecessors. The history of Ballentine Laboratories from its inception until the death of its founder in May 1944 is largely concerned with the individual efforts of this one man. a brilliant physicist and engineer, his activities ranged from fundamental analysis and measurement of acoustic phenomena to engineering development of tubes and circuits in radio broadcasting and reception.

Some fifty scientific papers, thirty patents and one book in his name attest to his high degree of standing in the electronic field.

Mr. Ballantine was the recipient of many honors. In 1920 he received a special award and citation by the Secretary of the Navy for the development of a radio direction-finder. In 1923 he was elected a John Tyndall Fellow in Mathematical Physics at Harvard University. In 1931 he received the Morris Liebmann Award of the Institute of Radio Engineers. In 1934 he was awarded the Elliot Cresson Gold Medal by the Franklin Institute of Philadelphia.

In 1947 he was posthumously awarded the Armstrong Medal of the Radio Club of America and the following citation: "The Armstrong Medal of the Radio Club of America is awarded to Charles Stuart Ballantine for outstanding contributions to the art."

"In the period of 1908 to 1916 he pioneered in radio in the Philadelphia area just as the members of the newly born Radio Club similarly pioneered in the New York area."

"Out of that early experience came his book 'Radio Telephony for Amateurs' which was, in effect, the first amateur "bible" and from which the long line of similar publications has since descended."

"During World War 1 and building on the discovery of others of the Club, he developed the loop compass and radio direction finder as the primary and major defensive tool against the otherwise utterly successful submarine warfare of the German navy. Shortly after his entrance into the field of broadcast receivers in 1923, he developed the principle of negative feed back as well as of automatic volume control."

Later came his epoch-making work in

developing on purely mathematical basis the theory of the vertical antenna and its low-angle radiation, the soundness of which continues to be attested by the radiating system of substantially every broadcasting station in the world today.

Later his work in acoustics ranging widely from new microphone calibration techniques, the invention of the throat microphone as standardized by the U.S. Army Air Corps, the development of especially high fidelity reproduction, and so forth.

His many, many inventions and developments which together comprise far too long a catalog to be here detailed, mark accomplishments made primarily as an individual and all-too-often unsupported experimenter, who, persisting always against odds that would, themselves and alone, have defeated someone of less stamina and enthusiasm, won out to the ends that contributed so mightily to making radio communication and radio broadcasting the important instrumentality it is today."

Ballantine Laboratories, located just off Fanny Road, Boonton, has continued to function in the manufacture and development of precision electronic measuring instruments and special types of Geiger-Muller tubes used in cosmic ray research and certain industrial applications. The Ballantine electronic voltmeter, because of its sensitivity, accuracy and stability is probably the best known and the most widely used of all electronic voltmeters. The present officers of the company are: Henry Ladner, president; Frank R. Zayac, vice president; Virginia O. Ladner, treasurer. The chief engineer who has been with the laboratories for many years is another local resident, Edmund Osterland.

Old-Time Radios! Restoration and Repair

by JOSEPH J. CARR

**A complete training guide to restoring
vacuum tube and transistor radios**

A visit to any ham radio show (hamfest) or "swap" meet proves that the restoration of antique and classic radios is a fast growing hobby. Old-time radio enthusiasts of all ages and levels of skill can experience a special satisfaction from winding their own coils and soldering their own taps and lugs.

In *Old Time Radios! Restoration and Repair* readers will find the history, theory, and practice operation behind old-time radio sets, and the detailed instructions and schematics needed to repair or rebuild them. In addition to covering the vacuum tube circuits of radios made before 1950, author Joseph J. Carr provides transistor theory and practice that radio buffs can use on many of the sets produced in the 1950s and early 1960s. Carr also includes valuable information on:

- ☐ Power supply circuits
- ☐ Capacitors and other components
- ☐ Amplitude modulation detectors
- ☐ Multimeters—the VOM, VTVM, and DMM

And, Carr provides a complete classic radio troubleshooting course, a capacitor/resistor color code chart for identifying radio parts, and vacuum tube pin-out diagrams that are often absent from schematics.

Filled with hard to come by information from the pioneer days of electronics, *Old Time Radios! Restoration and Repair* is one of the most complete books on repairing antique radios available.

About the Author:

A columnist for *Ham Radio* and *Popular Electronics* magazines, Joseph J. Carr is a senior electronic engineer and holder of the coveted Certified Electronics Technician certificate in both consumer electronics and communications. He is the author of 23 books for TAB, including the *Practical Antenna Handbook*.

CONTENTS: Brief History of Radios—Vacuum Tube Radios—Vacuum Tubes: How They Work—Radio Receivers: The Basics—Radio Power-Supply Circuits—The Audio Section—The Radio Front-End: RF Amplifiers—AM Detectors—Radio Repair—Basic Radio Troubleshooting—Troubleshooting Intermittent Problems—Radio Alignment—Repairing Water Damage to Radios—Electrical Safety on the Workbench.

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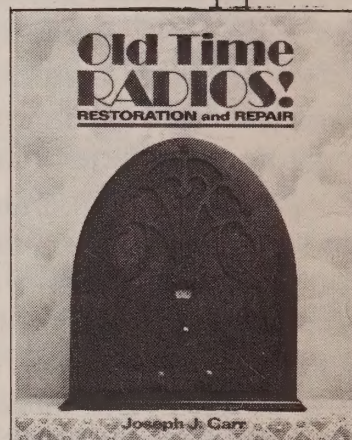
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BOOK REVIEW

"THE LEGACIES OF EDWIN HOWARD ARMSTRONG"

Publisher: The Radio Club of America, Inc. - 1990

Editor: John W. Morrissey

321 pages. 8½ by 11 inches.

Soft cover, \$13.95

Although this book is designated Volume 64, No. 3, November 1990, of the Proceedings of The Radio Club of America, Inc., (founded 1909), it is indeed a **book**, and a most interesting and valuable one; every radio historian and collector should read it and have a copy in his library. Its publication marks the one hundredth anniversary of Major Armstrong's birth on December 18, 1890.

The book focuses on the four principal legacies of this great radio pioneer - the Regenerative Circuit, the Superheterodyne Circuit, the Superregenerative Circuit, and Frequency Modulation. There is a 62-page introductory series of twelve articles by people who knew Armstrong well, including one, *"The Father of FM - The Tragic Story of Major E. H. Armstrong"* by Ms. Jeanne Hammond, Armstrong's niece, who tells of her uncle's early life, his student years at Columbia University, his work with Professor Michael Pupin, and his development of the FM system. Ms. Hammond concludes by recounting how, in 1954, while involved in costly, drawn-out litigation in which he fought to uphold the validity of his FM patents, he took his own life.

The twenty pages dealing with the Regenerative Circuit contains a welcome reprint of three articles by Armstrong published in the period 1914-1921. The article,

"Some Recent Developments in the Audion Receiver", first published in Proceedings of the IRE, September 1915, is **must** reading for collectors who want to know the genesis of their old regenerative receivers.

This reviewer found the 72-page section on the Superheterodyne Circuit to be of particular interest. It leads off with four articles written by Armstrong himself and first published in the period 1919-1924. In the United States Major Armstrong is widely regarded as **the** inventor of the superheterodyne receiver. Certainly Armstrong did independently invent the superheterodyne circuit, and with his significant improvements brought it to a high state of perfection and popularity. But, as ARCA member Alan Douglas points out in his 20-page article, *"Who Invented The Superheterodyne?"*, a French inventor, Lucian Levy, whose U.S. patent was owned by A.T.&T., had filed his patent application on the superheterodyne system seven months prior to the date on which Armstrong first conceived his invention. Therefore, under the patent laws of such countries as France, Germany, and the United States, legal title to the invention went to Levy.

This section also contains an interesting article, *"On The Origin Of The Superheterodyne Method"* by the German radio pioneer, Walter Schottky, first published in 1926. Schottky concluded that Levy "must be considered, at least from the point of view of patent law, as the true originator of the superheterodyne method . . ." There is also a letter in the original French, written by Lucian Levy in 1954, and its

English translation, *"On The Subject Of The Superheterodyne"*. The section concludes with an eight-page article by ARCA member Ed Lyon entitled *"Probably A Whole Lot More Than You Ever Wanted To Know About The Superheterodyne Receiver"*.

The section on Superregenerators comprises a single article by Major Armstrong, *"Some Recent Developments Of Regenerative Receivers"*, originally published in the IRE Proceedings, August 1922. This nine-page paper casts much-needed light on what is surely the least well understood of Armstrong's four great contributions.

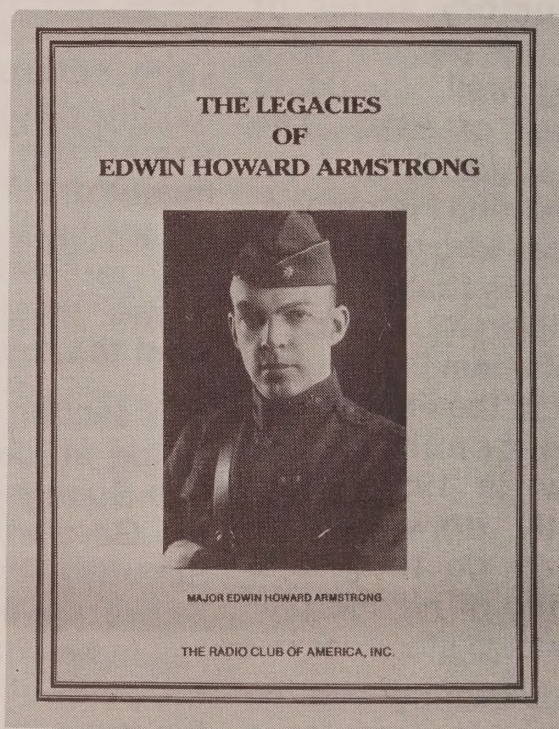
Readers will not want to miss the eight-article, 81-page section dealing with FM. Four of the articles were written by the Major himself and first published in the period 1936-1953. The last article of this

section, "The Armstrong FM Litigation" is by Armstrong's patent counsel, Dana M. Raymond, Esq. This litigation, lengthy, costly and discouraging to Armstrong, was courageously carried on to a successful conclusion by his widow, after Armstrong's death by suicide.

An eight-page section of the book contains four "Miniature Biographies". Each is well worth reading. Finally, there is a 54-page, 19-article Appendix that differs radically from the more typical appendices in that it will be read with the same interest that readers will give the preceding sections of the book.

This book is available from ARCA by way of its Charleston Chapter, 4204 Thorn Apple Lane, Charleston, WV 25313, for \$15.95.

Bill Denk, W3IGU
ARCA Treasurer (Retired)



***Very large 8½x11 321 Page Book is available at an unbelievable price of \$15.95.
Very limited quantities available!!!***

MAJOR ARMSTRONG TESTS THE FIRST FM NETWORK

*by Ralph Williams
ARMSRBRJ*

The recording to follow this introduction is a copy of an old disc recording made on February 14, 1941, at 11:30 PM at Harford, CT taken from an FM receiver tuned to the FM transmitter at Paxton, MA.

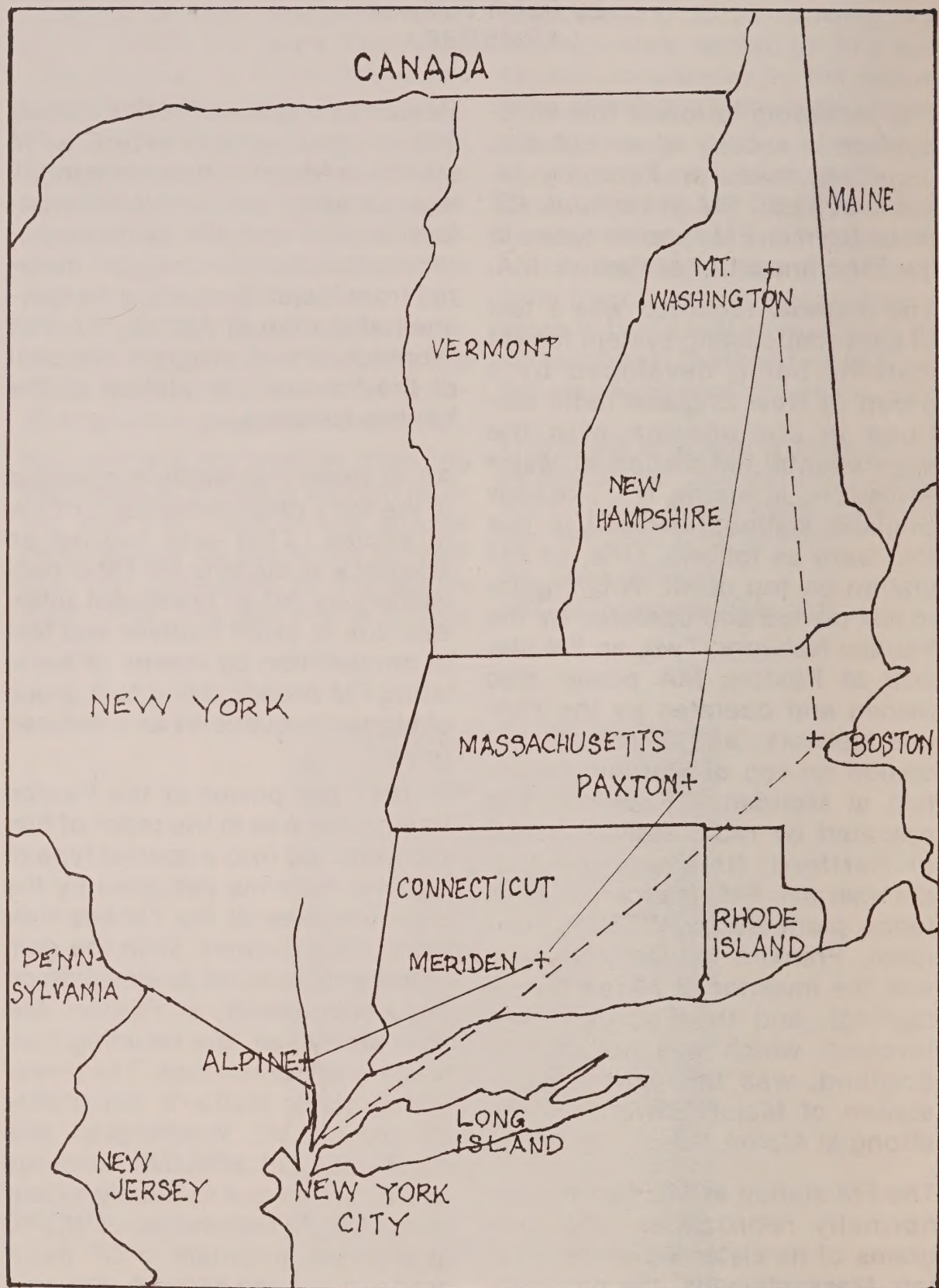
The material recorded was a test of a rebroadcasting system for FM stations being developed by a group of New England radio stations in conjunction with the experimental FM station of Major Armstrong at Alpine, NJ. The New England stations involved in this test were as follows: One, an FM station on top of Mt. Washington in NH owned and operated by the Yankee Network; Two, an FM station at Paxton, MA power also owned and operated by the Yankee Network; and Three, an FM station on top of Meriden mountain at Meriden, CT, owned and operated by radio station WDRC of Hartford; (this was the first commercial FM station in existence, pioneered by WDRC's president, Franklin M. Doolittle who was the inventor of stereo broadcasting), and the Fourth station involved, which was not in New England, was the experimental station of Major Edwin H. Armstrong at Alpine, NJ.

The FM station at Mt. Washington normally rebroadcast the programs of its sister station at Paxton, Massachusetts, the programming for the Paxton station originating at Boston studios of the Yankee Network and carried to

Paxton by a special FM link circuit. The programming of WDRC's FM station at Meriden mountain in CT was normally from the WDRC Hartford studios and also consisted of rebroadcasts of the program material from Major Armstrong's experimental station at Alpine, NJ, and rebroadcasts of program material of the Paxton, MA station of the Yankee Network.

All of these transmitters operated in the forty megacycle band of frequencies. This was before an attempt was made to kill FM broadcasting by other broadcast interests due to profit motives and fear of competition by means of legislating FM broadcasting to a group of higher frequencies and reduced power.

In 1941 the power of the Paxton transmitter was in the order of fifty kilowatts fed into a special type of turnstile antenna designed by the chief engineer of the Yankee Network, Paul Dumars. With the gain of this antenna and its elevation on Mt. Asnebumskit, at Paxton, MA near Worcester, the resulting coverage was tremendous. The power of the sister station's transmitter on top of Mt. Washington was much less but effective coverage was obtained due to the high location. The FM transmitter of WDRC at Meriden mountain in CT delivered around one kilowatt into a six bay turnstile antenna located at a height of approximately a thousand feet above sea level. Good



coverage was obtained under these circumstances. The FM transmitter of Major Armstrong at Alpine, NJ across the Hudson river from Yonkers, NY was around fifty kilowatts feeding a turnstile antenna located on a steel tower on high ground above the Hudson river.

Major Edwin H. Armstrong, FM's inventor along with the pioneer FM broadcasters in New England wished to develop an FM network of high quality without the necessity of using telephone lines to link the stations together as is commonly done with network operation, resulting in loss of quality and resulting in added expense of operation from rental of these lines. The plan in mind was to have each station in the FM network simply rebroadcast its adjacent station which would require no special equipment other than a good FM receiver. Such a rebroadcasting procedure would be feasible because of the high quality available from FM transmissions as compared to those of ordinary AM broadcasting. In addition FM broadcasting would be free of any interfering noise whereas AM broadcasting is not.

On February 14, 1941, a test of the possibilities of such a network was conducted by the FM stations at Alpine, NJ, Meriden mountain in CT, Paxton, MA, and Mt. Washington in NH. A conversation between Major Armstrong at NY and the engineers stationed at Mt. Washington was carried on by relay by all four of the stations, the voices from the top of Mt. Washington being heard in New York City by way of relay from Mt. Washington through Paxton, through Meriden

and through Alpine, NJ. Major Armstrong's voice was the only one that was not broadcast as high-fidelity quality because of the fact that in order to converse with the engineers at Mt. Washington he had to be linked into the Paxton transmitter over an ordinary telephone toll circuit with its restricted response. He was talking from New York City for this demonstration.

The persons involved in these FM engineering tests were not professionally trained speakers or entertainers ordinarily used in radio broadcasting but highly trained experts in the technical development of frequency modulation broadcasting whose professions were engineering skill and not public speaking. Also at Mt. Washington in addition to the engineering experts, there were experts in the art of survival at that location in the hazardous winter months where the temperature drops far below zero and the winds exceed 100 miles an hour at times.

The excerpts to follow taken from the disk recording made on February 14, 1941 from an FM receiver located at Hartford, CT and tuned to the FM transmitter at Paxton, MA are quite scratchy at times. This is due to the age of the original disk recording which had become brittle and deteriorated. Therefore it is not possible to appreciate the actual quietness of the original FM tests of 1941. There is also on the original disk some hum that came from the original recording equipment at Hartford but which was not on the original FM test. Even with these restrictions to full appreciation of the FM tests, the recording is of interest

historically because it contains the voices of some of the famous FM pioneers including that of Major Edwin H. Armstrong, who in addition to being the inventor of FM, also has many other important inventions to his credit, one of which is the superheterodyne circuit which is basic to all radio receivers in use today, FM, AM and television.

We now hear Major Armstrong speaking from NY city over the FM test setup asking the engineer at the FM station on Mt. Washington about the wind velocity on the mountain.

Major Armstrong asks: "Have you had anything up around 200 miles an hour this year?"

Lafayette, the engineer answers: "No, we haven't. The highest we've had is 144 in gust winds so far this year and that was when our temperature got down to 30 below zero. It was pretty bad then out there, you couldn't stay out very long. The big thing—one of the boys here froze his face three times and he was not out more than five minutes at each time. The wind would do that to you. With that low temperature you wouldn't even feel it, as far as that goes, only when you come into the building though, we always looked at each one that came in to see that nothing was froze because you could see right off white patches over their face, so we used to take snow and wash 'em right away so they wouldn't be—wouldn't be too bad."

Major Armstrong: "Well I'm going to have another try at the mountain a little while later in perhaps, the early part of March, and I hope you'll pick a time for me when we

don't have weather like that."

Major Armstrong: "You know, changing the subject, Lafayette, it just is hardly possible to believe that you're on Mt. Washington. As a matter of fact, you're right here in the room with us."

Lafayette: "Well, you sound the same way up here too, Major. It's a—I would think, really that you was right here with us. And even we're that long distance apart—"

Major Armstrong: "Well of course, I'm a, my voice is handicapped by going over the land line to Boston. But you come, your voice comes the whole way by radio relay."

Lafayette: "Oh, it does?"

Major Armstrong: "Yes, and every inflection of it is right here with us."

Lafayette: "Yes, yes, that's very good then."

Major Armstrong: "Is Unkas up there, or is he asleep?"

Lafayette: "Yes, he's right here with me in the radio room. He's coming over."

Major Armstrong: "Well, put him on."

Lafayette: "Yes, here he is."

Unkas: "Hello, Major."

Major Armstrong: "Hello, Unkas."

Unkas: "Glad to hear you again."

Major Armstrong: "Well, I'd recognize your voice here. I wouldn't take anyone's word that this was coming over four jumps, if I didn't know that the circuit was set up in that way."

Unkas: "Gee, I'd expect you to walk in the door any minute, the way you sound."

Major Armstrong: "You know, the noise level on this circuit must be

down at least 50 db. It's perfectly quite."

Unkas: "Gee, we've never tried this set up before, and it took us a little bit to get warmed up and see what we do here. That's why it acted a little funny when we started it going this evening."

Major Armstrong: "Was it up at your end?"

Unkas: "Well, we had our gains too high cause we just didn't know what to set it on for the start. Never been hooked up before, you see."

Major Armstrong: "Um. Well there's nothing the matter with it now, and now that we've got it set up, sometime when you have one of these hundred and fifty mile an hour winds, I'd like to hear that wind here in New York I mean. We'll set it up again and pipe it down here. You know, in the early days, of the transcontinental line, the telephone company set up a circuit so that the people who lived on the east coast could hear the surf on the west coast, and those who lived on the west coast could hear the eastern surf. But there are very few people that have heard the winds of Mt. Washington, and I think sometime, in the next month or so, we ought to set it up and put it out over one of the major networks."

Unkas: "Sure makes quite a racket when it goes by."

Major Armstrong: "Well, I was up there one night when it averaged 100 mph and that was loud enough for me."

Unkas: "Yeah, you've heard what it's like, then."

Major Armstrong: "The only thing that'll really describe it is likening it to riding in an express train with

the windows open and going by a long freight on the next track in the opposite direction.

Unkas: "Yes, sounds just about like it, yes."

Major Armstrong: "It never lets up."

Unkas, laughing: "It's a long freight train."

Major Armstrong: "Well now if you'll hold on a bit, we'll pass down the line to Paxton and ask Mac what kind of weather he's got there and then after that we'll pass on to Meriden mountain and finally to Alpine and then I'm going to get Paul in on the wire. Hello, Paxton."

Robbie: "Hello, Howard."

Major Armstrong: "Mac?"

Robbie: "No, it's Robbie."

Major Armstrong: "Oh, Robbie. My word! How could I mistake your voice? Chuckle."

Robbie: "I happened to be standing right here, Mac's in the other room."

Major Armstrong: "Well, Robbie, this is unbelievably good."

Robbie: "Yes, it sounded pretty good here."

Major Armstrong: "For first try it's a lot better than I hoped."

Robbie: "So far, the only discordant note that I could detect wasn't of our doing, but of our friend the telephone company."

Major Armstrong: "Yes, I'm afraid I lost my temper there when it rang in my ear. Chuckle. Robbie, are you icing up any?"

Robbie: "Well a little, Howard. We got oh, about half an inch of ice on everything. I had a little trouble coming up the road earlier this evening, but, it's dense fog, tem-

perature about 31, just enough so that it's adding up all the time."

Major Armstrong: "I see you didn't even think that I was referring to the possibility of your getting standing waves on that antenna of Paul's."

Robbie: "Oh no, I haven't been able to detect any. I've been out and felt the lines over several times today. I don't see that they behave any different during this than they do any other time."

Major Armstrong: "Well I guess we'll have to join you one of these days in that type of antenna at Alpine."

Robbie: "Well, get yourself a good plumber."

Major Armstrong: (Chuckle) "Righto. Well, Robbie, we'll leave you for a minute. I'm gonna call John Denny at Meriden mountain, and ask him if he'll make a report on the weather there, and then I'm going to follow that up with Alpine, and then come back to Paul again."

Robbie: "Well OK, Howard, see you later."

Major Armstrong: "Hello, Meriden." We are unable to hear the reply of Meriden because of the fact that the receiver feeding the original disk recorder back in 1941 was tuned to the Paxton station. So we'll now jump over this part of the test and go back to where Major Armstrong converses again with Paxton. Incidentally, that crunching sound in the background was some kind of interference in the telephone line that connected Major Armstrong, in New York, with the transmitter at Paxton.

The next voice is that of Paul deMars, speaking from the Boston studios over the FM link where he

was cut into the test circuit at the Paxton transmitter.

Paul: "I'm in an office in Boston."

(Major Armstrong chuckles)

Paul: "Howard, for the benefit of the boys at Mt. Washington, I want to refresh your memory about an attempt that was made, not so long ago, to climb a little mountain in MA. Have you forgotten?"

Major Armstrong: "Well why, why bring that up?" (Laughter)

Paul: (More laughter) "Well, I don't think we ought to keep it quiet any longer."

Major Armstrong: Well Paul, that was the fault of the automobile and not the fellows who were in it."

Paul: "Well, I'll check that."

Major Armstrong: (Chuckles) "How many days did it take to get that car again?"

Paul: Well, I think it took a full day of rather ticklish work if I remember, to get it back."

Major Armstrong: "Well, next time I climb a mountain with you in an automobile, I'm going to have my clampons in my pocket."

Paul: "Well, I think we needed them that night, alright,"

(Major Armstrong laughs with Paul)

Paul: "If I remember, each of us did a tailspin on several occasions."

Major Armstrong: "I never fell down so many times in one evening in my life."

Paul: (Chuckles) "I think you recognize, probably, some of the characteristic disturbance on this circuit is entering through the telephone line. And, I think it might

be worthwhile while everything is all set up to cut that and give you and the people along the line an opportunity to see the improvement on the radio circuit. So I'm going to cut that for just a few minutes."

Major Armstrong: "You're going, you're going to cut me out?"

Paul: "That will cut you out."

Major Armstrong: "Yes, all right."

Paul: "You are now cut off from the circuit and only the radio relay is involved. The listeners all of the FM stations are now hearing the radio circuit only and not the telephone line tied in, which is contributing the larger part of the disturbance that was formerly on the circuit. I think that's sufficient. Hello, Howard."

Major Armstrong: "Yes, Paul, the hum dropped out immediately."

Paul: "Yes, and then on this end there was what was apparently proximity to a facsimile. Before we take the circuit down, I'd like to talk to the mountain, if you don't mind standing by for a minute. Hello, Mt. Washington."

Lafayette: "Hello, Paul."

Paul: "Hello, Layfayette."

Lafayette: "Good evening, Paul."

Paul: "Well, how are the diesels? Are they purring along like kittens?"

Lafayette: "Oh gee, them two diesels are sweethearts."

Paul: "Well, that's fine."

Lafayette: "Those are my two children, you know."

(Paul laughs)

Lafayette: "I gotta keep them going in very good shape."

Paul: "Yes."

Lafayette: "We have no trouble whatsoever, so far, with the diesel, long's you change the oil. I been changing the oil regular in them, and checking 'em every two days."

Paul: "Fine."

Lafayette: "And every day, of course I always look 'em over."

Paul: "Yeah"

Lafayette: "And see that everything's all right. I always do that after midnight."

There follows a discussion of food supplies on the mountain. Then the conversation returns to the operation of the network.

Paul: "Well fine, Lafayette, it's a great pleasure talking over this circuit and to know that the voices from the mountain are being heard almost perfectly all along the line from Paxton, and from Meriden, and in New York city."

Lafayette: "Yeah, you sound just like you was sitting here in the room with me. You're just as clear as it can be. Can't ask for any better quality."

Paul: "Well, as soon as you get that carriage road shoveled out, I will be up there and start the new construction which will result in the new 10 Kw apparatus and new living quarters for everybody on the mountain."

Lafayette: "Well, then we'll be looking for you, June first."

Paul: "You bet."

Lafayette: "Yes sir, for — "

Paul: "Give my regards to the boys, Lafayette, and I'll ask the Major to come in for a few last words."

Lafayette: "I'll say good night, Paul."

Paul: "Good night, Lafayette."

Major Armstrong: "Well, Paul, I'll say good night too, and I just want to thank the boys on Mt. Washington, Mac at Paxton, John Denny at Meriden and the boys at Alpine, and to say that the next time that we do this, I think we can have added in a few added innovations, which I'd like to talk over with you, Paul, out at Columbus."

Paul: "All right, then it's a date."

Major Armstrong: "When we get back we'll do it again and with the innovations that I mentioned. Good night, everybody."

Paul: "Good night from Boston."

Lafayette: "Good night, Major, this is Mt. Washington."

Mac: "And good night from Paxton."

Denny: "Good night from Meriden."

Narrator: "This is W1XOJ, Boston, the frequency modulated, high frequency broadcast station, owned and operated by the Yankee Network with transmitting facilities at Paxton, MA. This concludes the broadcasting activities of W1XOJ for today. We will return to the air at eight o'clock tomorrow morning. Good night."

OBITUARIES

EVERETTE MITCHELL

Everett Mitchell, pioneer Broadcaster in radio and television, died Nov. 9 in Wheaton. A child soloist who sang with Evangelist Billy Sunday for several years, he presided over the first major daytime network radio program

Mitchell was born March 15, 1898 on the Moreland Prairie, an unincorporated area immediately north of Chicago and Oak Park. His father, a former railroad engineer, operated a truck farm on the prairie which later was absorbed by the City of Chicago. He grew up watching and then working beside his father who cut hay with a cradle scythe.

As a small child, Mitchell was recognized for his unusual singing voice. His Sunday School teacher was so impressed that she paid for a year's vocal lessons for the youngster.

Soon Mitchell was invited to be a boy soloist at Chicago's famous Pacific Garden Mission. At the age of 14, he was a soloist at the revival meetings for Billy Sunday.

Mitchell's trained speaking voice made him a logical candidate to perform on radio when Chicago's first commercial station went on the air in 1922. At the time, he held a position with a Michigan Avenue insurance agency.

Last week, Mitchell observed the 87th anniversary of his first appearance on commercial radio. In the early days of radio, any reasonably talented person could visit a station and ask to perform on the air.

On Nov. 3, 1923, Mitchell went to Station KYW, the Westinghouse station in Chicago, and sang on its evenings amateur program. Listeners loved his performance. They swamped the station switchboard with telephone calls asking for encores.

Mitchell soon left the insurance business to become a professional broadcaster. He did not heed the

admonitions of his office manager, that the "Radio was a fad that would not last six months." Within a few months, he was manager of a new radio station, WENR, which eventually became a part of the National Broadcasting Company (NBC) radio network. Mitchell set many firsts in radio, including the first regularly scheduled programs.

In 1928, NBC created a nationwide program which would appeal to the nation's farmers. The network planned to have the show, the National Farm and Home Hour, originate from Chicago. The search began for a man to serve as program moderator. Mitchell's intimate knowledge of farming won him the position which he held for more than 30 years.

On Saturday, May 14, 1932, Mitchell opened his noonday show with an unusual greeting, "It's a beautiful day in Chicago. It's a great day to be alive, and I hope it's even more beautiful wherever you are." This greeting opened the six-day a week farm broadcast for the next 28 years.

NBC estimated that at its peak with Mitchell at the helm of the National Farm and Home Hour program, has talked to five million people daily. For 16 years, NBC radio and its affiliated stations carried the show as a sustaining program for the benefit of the nation's farmers.

Working in conjunction with the U.S. Department of Agriculture, NBC and Mitchell played host to four United States presidents. They were Presidents Herbert Hoover, Franklin D. Roosevelt, Harry Truman and Dwight D. Eisenhower.

Eisenhower asked Mitchell to

become secretary of agriculture during his first administration. As vice president of agriculture at NBC the broadcaster rejected the position stressing that he could help agriculture more by continuing his radio and television programs.

For years, Mitchell was listed in broadcast surveys as one of the best known and most respected men in America. He received numerous national and international awards, including one from the U. S. Department of Agriculture in 1987 honoring him with its Great Service To America Award.

In 1954, Mitchell, his wife, Clara and their infant son, Peter, moved to their Beautiful Day farm south of Wheaton. There, he hosted agricultural officials from around the world and operated an experimental farm in conjunction with the University of Illinois for 19 years.

Mitchell was one of the founders and officials of the International Farm Youth Exchange (IFYE). A student exchange for farm youth of the world. The program continues in 1990.

Mitchell's deep religious roots continued throughout his lifetime. He was an active lay leader in the Lutheran Church of America.

Mitchell is survived by his wife, Clara of Wheaton, and a son, Peter of Dallas, Texas.

A memorial service was held at 7 p.m., Monday, Nov. 12, in St. Paul Lutheran Church, 515 S. Wheaton Avenue, Wheaton. The family requests memorials in Mitchell's name be sent to Bethphage Mission, 11128 John Galt Blvd., Omaha, NE 68137.

NEARC SPRING SWAP AND SELL MEET

The New England Antique Radio Club will hold its Spring Swap & Sell Meet Saturday, April 20, 1991 at Resurrection Center, 449 Broad Street, Nashua, NH.

Participating will be club members from throughout New England, New York and New Jersey with over 100 tables of antique and collectible radios, TV's, parts, books, magazines and other related items for sale or trade. Special events of the day will include two old equipment contests featuring Zeniths and Best Junkers, as well as a radio repair seminar on soldering techniques by Scott Phillips. Member and non-members alike are invited to attend and enjoy a day of radio fun and nostalgia.

Swap Meet hours are 8 a.m. to 1

p.m. Early buyer admission is \$5.00 from 8 a.m. to 9 a.m. and general admission is \$1.00 from 9 a.m. to 1 p.m. All proceeds to benefit the New England Antique Radio Club.

To reach Resurrection Center, take Rt. 3 (Everett Turnpike), Exit 6:

TRAVELING NORTH: Turn left at the light onto Rt. 130 and travel 1 1/2 miles west. **TRAVELING SOUTH:** Turn right at the light onto Rt. 130 and travel 1 1/2 miles west. Watch for the NEARC signs on your right.

For more information about the Swap Meet or membership in the New England Antique Radio Club, call or write: NEARC, RR1, BOX 36, Bradford, NH 03221—Telephone (603) 938-5051.

ARVIN INDUSTRIES, INC.

by Lloyd McIntyre

Not much is ever said about this company in collector circles, unless, of course, one brings up the famous Hopalong Cassidy radio of 1950.

Q. G. Noblitt was just like his counterpart in the auto accessory business, J. Powel Crosley. Mr. Noblitt made the best tire pump and Mr. Crosley the best flag holder for the radiator cap.

Arvin acquired its name, which it still bears, in July, 1950. I guess that is a little ironic in that was the same year the infamous Hopalong Cassidy radio appeared.

The company was originally called, "The Indianapolis Air Pump Company", January 1, 1919 to December 31, 1921. Then the name "tube" was added and it became, The Indianapolis Pump and Tube Company". Then on December 29th it was completely renamed, "The Noblitt-Sparks Industries, Inc." and remained so until it took its present name.

Tire pumps in the early days of automobiles were as important as vacuum tubes were to radios. Everytime you turned around you either had a flat or your radio needed a new tube.

Maybe it was this reason that destiny took these two men into radio. The air that came out of a radio vacuum tube could be pumped into a flat tire. Kind of a balance in nature one would suppose.

Anyway, there are not too many names that survive today and only one comes to mind, that being Zenith. I am sure I will hear of others after this, but neither Arvin nor Zenith manufacture radios for consumer usage today. While they both remain in business, only Arvin is on sound financial ground. It will be interesting to learn, if out of all the hundreds of radio manufacturers that existed over the last 70 years or so that this little thought of company will become the last survivor.

Yes, there are several famous names still in use, such as Emerson, Crosley, Dumont, and a few others, but these were revived names long after the company was gone, and used on imports for name recognition purposes only. If anyone can compile a list of some of the more famous names in radio and where they went (ie RCA and GE to Thompson of France; Fisher to Sanyo, etc.), please send us the information so we might share it.

Shown below is a chronological list of Arvin's involvement in radio. For more information read the book by Coke Coons, **ARVIN—The First Sixty Years.**

ARVIN

THE FIRST SIXTY YEARS

Car Radios—1933-34
Home Radios—1935
Radio-Phonograph Combination—1937

Portable Radio—1938
Radio Communications Equipment for the Military—1941-45
Record Changer—1946
AM-FM Radios—1947
Clock Radios—1948
Television Sets—1949

The now famous Hopalong Cassidy Radio—1950

Clock-Radio/Timer—1952

Short-Wave Receiver—1952

Color Television—1954

3-Dimensional Stereophonic Phonographs—1960

Multiplex Adapter Stereo—1961

AM-FM Portable Radio—1962

Stereo Tape Recorders—1963

Vehicular or Portable Radio Receiver for interception of Direction-Finding—1964

Single Side-Band Receivers—Helicopter Transceivers—1965

Quarter-Wave-Tuned Tail Pipe Assembly—1966

(I'll bet you never heard of this one! Just when you thought your antenna was the only quarter-wave invented.) Home Tape Cartridge Players

Airborne Radio Navigational System-Flying Heads for Computer Systems—1967

CRV-XXI Color Video Recorder—1968

Vehicular-Mounted-Ground-To-Air UHF Communication System—1969

In 1972 ARVIN acquired Data Magnetics Corporation and in 1973 Diamond Electronics. From here on hi-tech products came about in many fields of communications, up to and including SAT-WEATHER producing color video weather pictures, using information transmitted from weather satellites.

MAKE THIS CHRISTMAS A "HOPPY" HOLIDAY!

HOPALONG CASSIDY

WONDERFUL PRESENTS

GIFT ROUND-UP

FOR BOYS AND GIRLS



REAL HOPALONG CASSIDY WESTERN JEANS AND JACKET

In blue, black reinforced denim. Secret pocket in jeans, two front pockets with button-down flaps. Zipper closure. Jacket has pleated front, pleated yoke back, adjustable buckle cuffs. Jeans sizes 4-14 \$2.98. Jacket sizes 4-14 \$3.29. Made by John Sells, Inc. World's Largest Makers of Work Clothes.

HOPALONG CASSIDY SOCKS

"Guaranteed strong like Hopalong." Blue, black, red, and white. 100% cotton. 12 pairs. \$2.98.

"HOPPY" SLIPPER SOCKS

Blue, black, red, and white. 100% cotton. 12 pairs. \$2.98.

MAKE BATHING FUN FOR JUNIOR with a HOPALONG CASSIDY BATH ROUNDUP by DAGGETT & RAMSDELL

Now your little Buck... Give him two large boxes of Pine Bubble Bath with brightly colored pictures of Hoppy—plus a sculptured cake of pure soap in the shape of Hoppy's famous horse, "Tupper". All three, and trading cards, too, for junior cowhand collections, correlated in one attractive, colorful package. \$7.00 plus fed. tax.

OFFICIAL HOPALONG CASSIDY RADIO by Arvin

Specialized designed for Hoppy fans—a real big-performing radio! It's a 4-tube beauty in fire red or jet black with silver trim. And don't worry or let blink with silver trim. The cabinet's crash-and-shatter proof! Clever new Lariatenna too. Year's guarantee. ARVIN INDUSTRIES, INC. Columbus, Indiana. \$17.95

OFFICIAL HOPALONG CASSIDY SLICK-UP KIT

Designed to take plenty of wear! Shaped like saddle bag. Check full of all the Hoppy things Junior needs to look neat & tidy. Includes: a Hoppy pen knife, soap, toothpaste, toothbrush, mirror and picture of Hopalong and Tupper, nail file, hairbrush, comb and container. \$7.95

Outside, a bright picture of "Hoppy" and "Tupper". Jeweled and studded. Handy leather wall hang-tab. BARTON PRODUCTS, INC.

OFFICIAL HOPALONG CASSIDY "DEPUTY" HAT

HOPALONG CASSIDY JACKET (style H8109)

Get him a hat just like his hero wears! Pure wool felt with "Bar 99" leather title on chinband. Two colors. \$1.85. The "Deputy" (not shown) larger shape for older boys. Embossed Hoppy head. \$2.95. Free autographed picture with every hat. Made by BAILEY OF HOLLYWOOD. Small: Ages up to 6. Medium: Ages 7 to 9. Large: Ages 10 to 12.

Surprise him with this practical, all-purpose "Hoppy" jacket for school—for play. Suede flannel lined. White vinyl plastic fringe on front and back yoke, white piping. In black gabardine \$6.95. In black corduroy style #209 (not shown) \$8.95. Sizes 2-12. By GEORGE RUSSELL SPORTSWEAR.

OFFICIAL HOPALONG CASSIDY SHOCK-PROOF WRIST WATCH

Chrome band, grey dial with illustration of Hopalong Cassidy. Red hands and numbers. Sh. black leather cowboy strap. Each watch signed with a personal message from "Hoppy". Regular \$4.95 plus fed. tax. Small (not shown) \$6.95 plus fed. tax.

HOPALONG CASSIDY ALARM CLOCK

Shiny black. Goes off with illustration of "Hoppy" and "Tupper". Red numbers and hands. 40-hour alarm movement. \$2.95 plus fed. tax.

HOPALONG CASSIDY JEWELRY FOR YOUNG AMERICA by Arson

Hopalong Cassidy Horseshoe Tie Slide, \$1.50

Hopalong Cassidy Pistol Tie Slide, \$1.50

Setting Silver Hopalong Cassidy Identification Bracelet \$3.50

HOPALONG CASSIDY JUNIOR CHOW SET

Little buckaroos will love it! All three pieces—just the right size for Junior—are embossed with Hopalong's likeness and name. Made of finest stainless steel that never needs polishing! Complete in gift box. \$1.95 No tax.

OFFICIAL HOPALONG CASSIDY SHIRT by LITTLE CHAMP OF HOLLYWOOD

Coldest, pre-shrunk, embroidered with Hoppy and Tupper. Size 12-22: rayon poplin in green solid colors. \$1.95. Size 1 to 14: \$2.95. THE GIFT SET by LITTLE CHAMP OF HOLLYWOOD. Ready-to-try and heretofore showing slacks and boots. Gift-boxed. 4 colors. \$1.95.

OFFICIAL SWEATER BY Barlag

OFFICIAL FRONTIER PANTS BY OXFORD

HOPALONG CASSIDY Portrait of "Hoppy" knitted into front and "Tupper" knitted into back. Toned color combinations. Sizes 2-12. \$3.95.

AUTHENTIC FRONTIER PANTS—Hopalong Cassidy embroidered on pockets. In Corduroy, sizes 2-12, \$5.95. In fine cotton gabardine, 2-12, \$4.95. In 3 colors. \$5.95.

MADE BY Rollfast

OFFICIAL HOPALONG CASSIDY BICYCLE

★ Two "Hoppy" Pouches
★ Western Studded Guards ★ Frontier Fringed Carrier ★ Genuine Leather Holsters.
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RADIO: AS I EXPERIENCED IT

by Bill Hoy

Chapter Eight

SHORTCOMINGS OF EARLY AUTO-RADIO POWER SUPPLIES:

Early auto-radio sets all shared one weakness, the need for a dependable source of high voltage for the tubes used. Motor-generators and other devices had been tried with small successes. By 1934 the vibrator-chopper had taken over the auto-set field, not because they were the solution but because they were simply the best of the unsatisfactory options.

The power supply in auto-sets required some method to change the six-volts DC of the car's battery into six-volts AC that could be increased, by a transformer, to the high AC source needed by the power-supply unit. This was accomplished by using a center-tapped primary, of the correct turns-ratio, on the transformer. The center of the primary was connected to the six volt DC line. The ends, first one then the other, were connected to ground, at a rate of approximately 100 cycles per second, by a vibrator-chopped unit with two sets of contacts so arranged that only one end of the transformer could be grounded at any one time, some early vibrators even had a second pair of contacts for the purpose of rectifying the high-voltage output of the transformer.

All vibrators were short-lived in service, the "synchronous" type that also rectified the high-voltage had so many shortcomings it soon was abandoned by all makers. The common vibrator had a host of problems for the designer, who

had to keep costs low to compete. The rapid switching created interfering noise that had to be suppressed by good shielding, and a buffer capacitor. A change in the value of that capacitor would result in failure of the vibrator contact-points. Those contact-points wore and pitted, in normal service, some shops tried to dress those points to restore normal service, some vibrator rebuilders came into being. I very soon decided a bad vibrator should be discarded, and a new one installed. Vibrators were used until cars went to twelve-volt batteries, and the low-voltage tubes were developed.

A major problem with vibrators was the very high number of different vibrators needed to meet the needs of different radios. There was never any evidence of any effort to standardize vibrators, it seemed every different set used its own custom-designed vibrator. Radiart, and Mallory, vibrator manufacturers of that time, had several pages of replacement unit listings in their catalog. I had two shelves stocked with Mallory vibrators and still, sometimes, found needed units out of stock.

AUTO-RADIOS RESULT IN BETTER, AND SMALLER TUBES AND PARTS

The increase in auto-radios created a demand for improved tubes able to withstand the heavy vibration and shock occurring in autos running over the un-paved

roads then still common in 1934. Even the paved roads were not so smooth, there was still a depression and the WPA had not yet given attention to roads that had been ignored for years. New tubes were developed that were actually two or more sets of tube elements sharing one cathode in one envelope, and performing the work that needed two or more tubes in earlier sets. These newer tubes, and existing tubes, were designed to be more tolerant of the wide changes in voltage found in cars of the time. In those days car generators used only third-brush voltage regulation. Voltages, at the radio, varied from around five with the headlights on and the engine stopped, to as much as seven and a half volts with no lights burning and the car driven fast. The voltage-and-current regulated generator did not appear in cars until about 1937. The very means used to stiffen those new tubes made for better performance in home sets, where they were quickly adopted.

The popularity of auto-radios resulted in another development that benefitted all radio. Because of the very small antennas, car radios had to be very sensitive. There was only so much room under the dash of the cars of that day, so the radio had to be made as small as possible, to fit the many different shaped spaces. Tuning capacitors had to be reduced in size, transformers made much smaller, even resistors and filter capacitors made as small as possible. These smaller parts had to be more accurately manufactured, and more rugged to withstand the shock and vibration in the automobile, so they cost more.

In manufacturing there is a principle called economy of scale, simply put it means that the greater number of an item one builds the less each unit costs. Manufacturers began using the smaller parts in their home radios to reduce parts costs. The new, smaller parts performed better than the older parts they replaced.

By the 1934 models year, a large number of car makes could be purchased with factory installed radio. Most of the these installations were well thought out, and attractive. Sets with specially shaped housings, to utilize the space under the dash of specific make cars, were being built by Philco and Motorola. Flexible cables were still used to transmit the dial and volume knob rotation to the set, but the cables were arranged in gradual curves.

All in all, auto radios were beginning to give the home sets real competition for receiving range and tone quality.

Servicing car-radios created a demand for radio-repairmen who had a good knowledge of the operation of the electrical equipment used in automobiles of the day. It was vital to know if connecting a capacitor across some connector post, in an attempt to reduce radio interference, would damage some electrical part of the car. A ruined generator or ignition coil could result in the loss of a weeks earnings, as well as more than one customer's repeat work.

By this time, all radios were about standardized. After '34 or '35, almost the only changes in radios consisted of refinements in appearance, and changes made to improve tone quality or sensitivity.

The radio market had become similar to the car market today, where one can buy an automobile outfitted any way he can afford. The difference was there was no add-on options. In any given brand name you chose the set with the most of the features, short waves, good sound, kind of dial, and sensitivity, you could afford.

One good came from all this development, home-radios were becoming so sensitive they could operate very well on only a small wire over a door-frame. That they were not as dependable as before can be blamed on the use of underrated parts in an attempt to

produce sets at the lowest possible cost.

About this time, the older of the two brothers I was caring for began to "bird dog" me, showing a great interest in anything I did. That pleased me, of course, so I started teaching him radio principles. In just a short time he was one of the best people I knew, in workmanship and soldering technique. He continued to help me until shortly before he entered into the army in World-War II. He still does some of the most beautiful electronic construction work I have ever seen.

NEXT: METAL TUBES

THE LEGACIES OF EDWIN HOWARD ARMSTRONG

by Ralph Williams

The Radio Club of America has recently published a book as part of its celebration of the centennial anniversary of the birth of Edwin Howard Armstrong. The name of the book is **THE LEGACIES OF EDWIN HOWARD ARMSTRONG**. Its 321 pages present fifty-six articles and other short pieces. The technical articles cover, in more than a little detail, Major Armstrong's contributions to the development of radio, ranging from the characterization of the Deforest's Audion to the performance of Frequency Modulation as a broadcasting system. Also included are seventeen biographies, eleven award discussions and eight obituary articles.

The book is a rather large (eight

and one half by eleven inches) soft-covered compilation of reprints that appeared in RCA's own journal, in the Proceedings of the Institute of Radio Engineers and other journals where progress in the development of radio has been recorded. Also included are reprints from other publications where the activities of the Major have been noted and discussed over the years.

Fourteen of the technical papers were written by the Major himself. They set forth the four main subjects covered in the book: the Regenerator, the Superheterodyne, the Superregenerator and Frequency Modulation.

Articles by three members of ARCA, Alan Douglas, Ed Lyon and

Bill Denk who are also members of RCA are included among the selections.

Alan Douglas examines the contributions of the other inventors of the circuit elements that today's radio collector "knows" must constitute a superheterodyne. When Armstrong's articles with their discussions and Alan's article are considered together, the reader will be pleasantly surprised to learn how exceedingly complex the process of developing a technical device (that can be used by ordinary people) really is.

Ed Lyon wrote a long article that reviews the superheterodyne from its beginnings through two World wars to the extremely different (yet completely similar conceptually) solid-state receivers of today. The article is excellent. We were intrigued with Ed's title, a jaw-breaker of 15 words. The Yearbook cut the title back to "More Than You Ever Wanted to Know". The article is must-read for all collectors and historians of radio receivers.

Bill Denk's article reviews a strange patent issued to Professor Michael Pupin and Major Armstrong. It was filed in 1915 when Armstrong was a graduate student under Pupin at Columbia. The patent concerns antenna resistance and its use to reduce static in reception. Today it is of limited interest as a technique but is of great interest as a pointer of Armstrong's career focus. The Major's work with the superheterodyne and Frequency Modulation had its beginning in trying to eliminate the effects of static. The research that was necessary to apply for this patent suggests that his inter-

est in static arose as early as his interest in understanding the Audion.

The first section of the book is made up of twelve articles whose nature is biographical. The Armstrong story is told from several points of view and is therefore worth reading for the collector who is interested in the people of historical radio as well as the artifacts. For the serious student of American inventors, these biographies do not offer enough direct insight into Major Armstrong's inner feelings.

The next-to-the-last section of the book contains five "miniature biographies". These are reprints of the biographical material that has appeared in encyclopedias and compiled biographies. They have been included in this publication by the Radio Club of America to provide a ready reference and as such are very useful. They do not add information to the biographies in the first section.

The last section of the book is titled Appendices. It is made up of Honors, Awards and Obituaries. The striking message of this section is the breadth of recognition accorded to Armstrong by the rest of us who look up to genius from our plodding paths. That he deserved it is unquestioned but that he received it in his lifetime lifts us toward his height.

All the way through the book, the main emphasis is on Major Armstrong's technical achievements and on the circumstances surrounding the official recognition of the primacy of those achievements. However, the material, especially that written by the Major himself gives a reader an oppor-

tunity to come into contact with the man and therefore to develop a more complete picture of him. Two of the articles are selectively quoted below to show, even through the drama of lawsuits and public recognition the quality of the Armstrong and why his loyalty, which is legend was matched by the loyalties he had from his co-workers.

The first article is "The Regenerative Circuit". It was originally published in the "Electric Journal" April 1921. The material is a review by Armstrong of his work with the Audion and its circuitry. Professor Pupin said in his introduction "Armstrong made his invention while he was about 21 years of age and before he graduated in the Department of Electrical Engineering at Columbia University in 1913."

The following quote from the beginning of the article gives a very good picture of young Armstrong. "The question as to how the invention of the regenerative circuit or feed back circuit came about can best be answered by the statement that it was the result of a streak of luck that comes once in a lifetime.

"For, all things considered, the operation of the regenerative circuit involves too many new phenomena, inextricably woven together with the operation of the audion, a device whose action was clouded in mystery of the DeForest gas ionization theory at the time the invention was made, for any one seriously to claim a mental preconception of the operation of the feedback method of amplification and oscillation.

"The invention was the result of an

idea — the kind of idea which may best be expressed in the form 'what would happen if' certain additions should be made to existing apparatus. The resulting trial of these additions uncovered a series of new phenomena based on a new principle. The discovery came out of a desire to find out exactly how the audion detected — not an easy thing to do in the dark ages of '11 and '12 when the very scanty literature on the subject explained (without explaining) that the action was due to ionized gas, and the audion was known to the art simply as a detector of high frequency oscillations.

"To find out exactly what went on in the tube, I started an investigation. This was carried on under considerable difficulty, since my main object in life just then was supposed to be the obtaining of the degree of Electrical Engineer at Columbia University, and the professors could not be relied upon for the necessary charity mark of 6 unless a certain so-called reasonable amount of time was devoted to their courses."

The picture that Armstrong painted of himself is warm and real. It clearly points to an outstanding mind by identifying the subject of the study, which was beyond the best engineers of the day, and also points to his humility by mentioning the serious concern of every student, getting grades high enough to successfully finish his studies.

The article continues with a description of the effects of changing the value of the phone condenser and then of adding an inductance in the plate circuit and changing

its value. Another quote is pertinent.

"Here the element of luck ended and it became simply a case of hard work, digging out the meaning of the various phenomena. A long series of experiments was carried out on different wave lengths and with various circuit modifications — "

Through those experiments, Armstrong recognized, characterized and regularized the behavior of the audion as an amplifier, a regenerator, a detector and an oscillator. His final paragraph looks back a little at the original work and looks forward to a new world of communications. It again tells us about the quality of the man.

"On account of the very fortunate combination of sensitiveness and simplicity, its effect on the art was immediate. The amplifying feature made possible transoceanic signaling. The self-heterodyne feature contributed very largely to the change from spark to continuous wave systems. The generating feature has been responsible for the development of carrier wave or wired wireless signalling. And this progress can be attributed, not to any carefully preconceived ideas, but to the versatile properties of the regenerative circuit and the luck that led to its discovery."

The gracious self-deprecation that is so apparent in this young man's description of his work carried through his life. To illustrate, another set of quotes is given below. They are taken from the address "Vagaries and Elusiveness of Invention" given by Armstrong when he was awarded the Edison Medal by the American Institute of Electrical Engineers in 1942. The

first part of the address acknowledges the award and for us further reveals the character of the man.

"It is not possible for me to find words to tell you what this honor means to me. To have belonged to the generation which learned the meaning of volts and amperes when Edison was at the height of his career, to be able to follow in the footsteps of my old instructor — Professor Pupin — who stood here 22 years ago, and to have my own work appraised, during these difficult days, as worth of the Edison Medal, give it an inspiring meaning that can never be described."

"But on an occasion such as this, when a man looks back over the events associated with his work, there comes some sobering second thoughts. For he begins to realize how minor is that part which he himself has played in shaping the events of his career, how overpowering the part played by circumstances utterly beyond his control. The continuous good fortune which has followed me, providing second chances at inventions when the first chance was missed and tossed away, has been all that a man could hope for and more than he has any right to expect.

"Only the invention of regeneration and the system of frequency modulation were the result of any conscious effort on my part to solve a definite problem. One problem was attacked on no theory at all except that something must be wrong with the existing one; the other problem was attacked by a method of reasoning that was to turn out to be just 100 percent wrong. And in each case,

a chance observation in the laboratory was to lead me to the discovery of principles the existence of which I never had the remotest idea. These occurrences, however, must be considered as the outgrowth of quite ordinary and conventional research in the light of the chain of circumstances which were to lead to the discovery of the superheterodyne and superregenerative principles. One of these was to come from a war and the other from a legal proceeding."

The address goes on to tell the story of the three links in the chain of events that led Armstrong to his experiments on the superheterodyne. These were Hazeltine's insistence on the mathematics of the heterodyne, Round's amplifiers and their specially developed tubes and his own desire to detect airplanes by listening to their ignition noise with a high frequency radio receiver.

Then he told about the discovery of the superregenerative circuit. It is a fascinating story that shouldn't be spoiled by a reviewer. One of the plusses that comes from the RCA Yearbook occurs right here. The Major's story involves a direct reference to a much earlier circuit that was disclosed in his 1915 paper. Almost every reader (including this reviewer) will page back and reread that paper and get caught up in the wonder of invention.

The last paragraph of the address is again typical of Major Armstrong. It shows his loyalty to his beginnings and to his associates.

"I have tried to describe the effect that circumstances quite out of my control had to do with the making of these inventions. I wish it were

possible to describe here also that part played by my old instructors and those who have assisted me through these years. Here also I have had extremely good fortune. For the moment I can only echo the thought expressed by the recipient of the Edison Medal last year, that he wished the names of those who had helped him attain it could also be engraved upon it, and say that whenever I look upon this award, I shall always see their names around it."

The two articles from which the quotes were taken gave the reviewer a chance to make a special point: Armstrong was a very broad person. He was a technical genius and he was a loving, warm man.

The technical articles which make up the four central sections of the yearbook are excellent for technical historians. However they are not so difficult to read that the non-technical reader will get discouraged. Altogether, this is an outstanding publication, a major credit to the Radio Club of America and a text that should be on every radio collector's shelf.

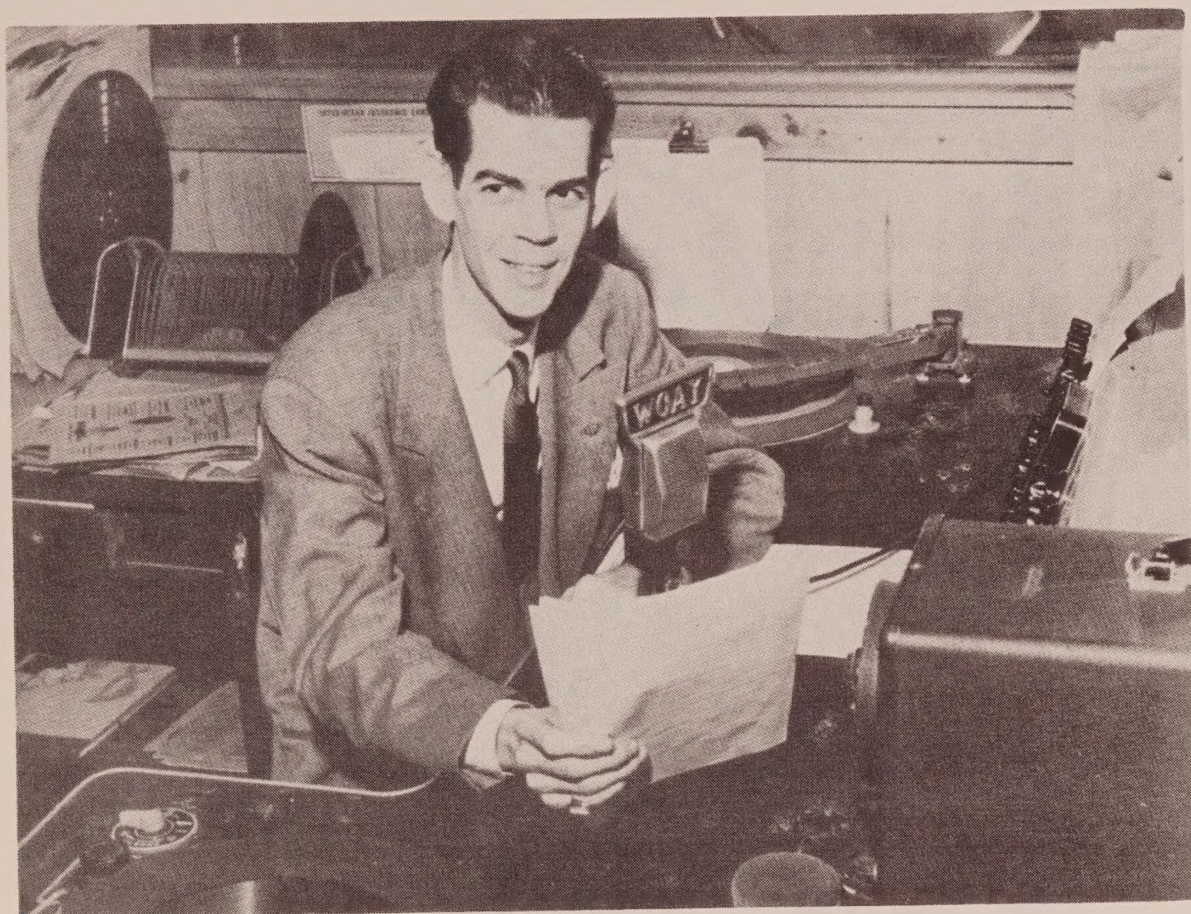
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Hugh McPherson "The Prince of Highland Swing"

NEWS FROM WEST VIRGINIA

IN MEMORIAM

Zane W. Parsons, Reporter

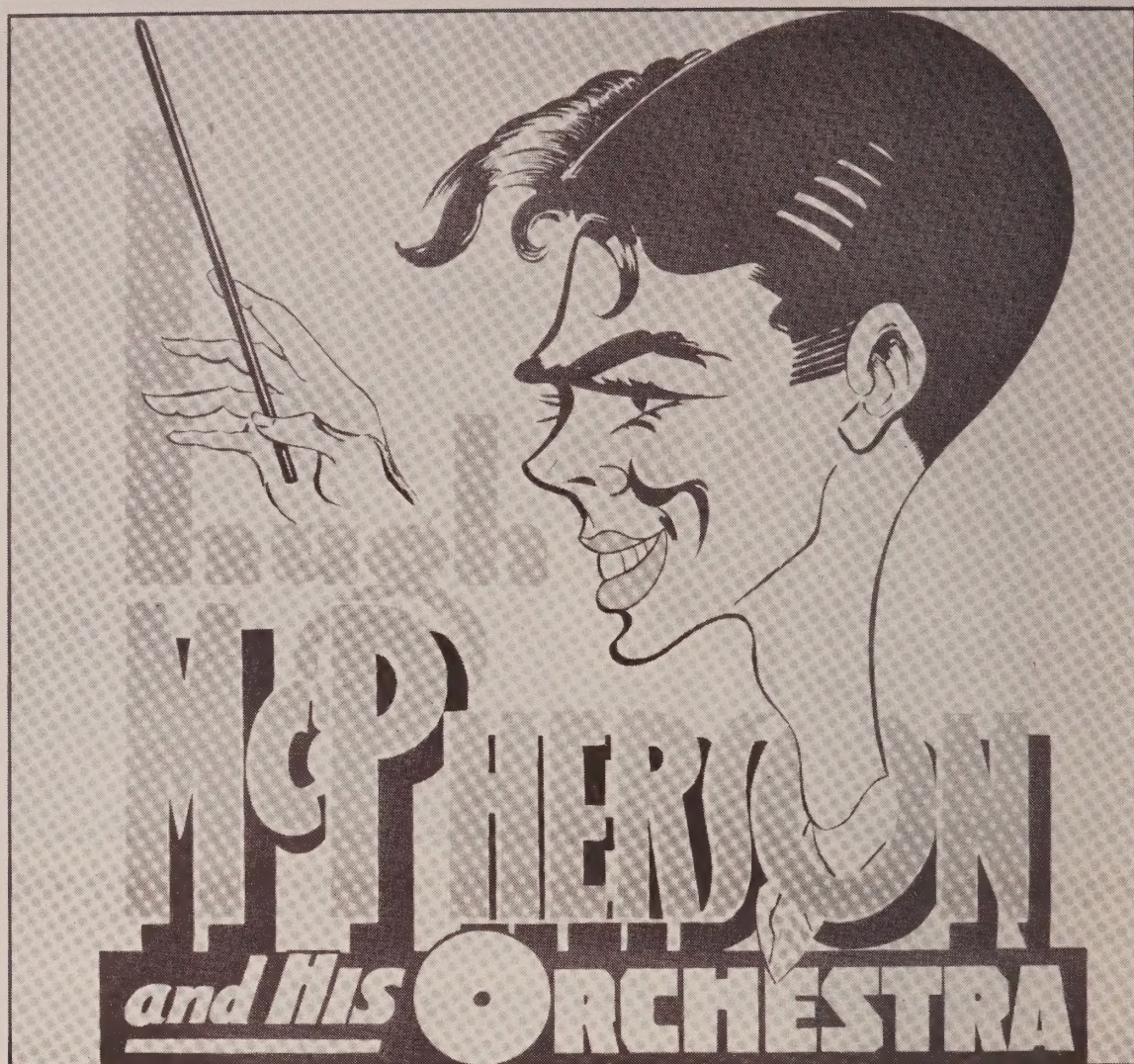
Hugh McPherson, band leader, radio announcer, and a strong supporter of the West Virginia Chapter, died Sunday, January 27th. Born October 17, 1913 in Louisville, Kentucky, he came with his family to West Virginia at two years of age.

After attending the Chicago Musical College and Northwestern University, he formed a band and toured the nation, performing on the East Coast, the West Coast and many points in between. He and his musicians played on WLW in Cincinnati, WNEY on the Yan-

kee Network, also on CBS and the Mutual Network.

Hugh met and worked with many well known entertainers such as Tommy Dorsey and Jimmy Durante. One of his band members, Johnny Best, later joined the Glenn Miller Band. His wife, the former Myrtle Mowry, from Iowa, was a singer whose stage name was Bette Barclay.

In 1947, he became a radio announcer and for the next four decades stayed active in this field. The last seven years of his career



were with West Virginia Public Radio.

During the span of his career, he interviewed hundreds of well known personalities in the music industry: Sammy Kaye, Guy Lombardo, Spike Jones, Sarah Vaughn, Billy Eckstine, Count Basie, Duke Ellington and many, many more.

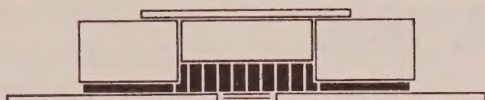
Once, on his radio show, during a live mike interview with Mutual Broadcasting news director Frank Edwards, Radio Moscow picked up his broadcast concerning the loss of seven cosmonauts in the Russian Space program, and answered him on the broadcast at the Charleston, West Virginia station. Stories of this were soon carried by AP, UPI, and the BBC. In

1983, Hugh interviewed Herbert Morrison, the on-scene reporter who witnessed and broadcast details of the Hindenburg disaster.

From the early days of the windup phonograph to LP albums, he amassed a collection of more than 20,000 records and albums. Many albums were lost in a 1979 radio station fire. Luckily, all his albums weren't at the station, but some rare and valuable ones were destroyed.

The president of Local 136 of the American Federation of Musicians is quoted "He was definitely the Godfather of big band and jazz in West Virginia, he will be sorely missed."

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February 19, 1991

Mr. Lloyd E. McIntyre, President
Antique Radio Club of America, Inc.
4204 Thorn Apple Lane
Charleston, WV 25313

Dear Mr. McIntyre:

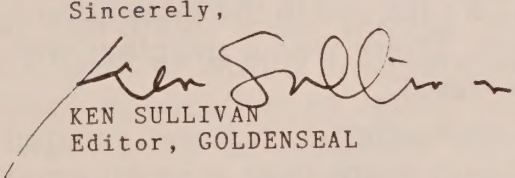
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MAJOR ARMSTRONG REMEMBERED AT COLUMBIA NOVEMBER 9, 1990

by Christopher Bacon

Major Edwin Howard Armstrong, the enigmatic genius who developed many of the basic concepts essential to modern communications, was the subject of a one-day conference at Columbia University Business School on November 9, 1990. The theme of the conference, which was organized by Columbia's Center for Telecommunications and Information Studies, was Major Armstrong, his inventions, and the problems he faced with patent litigation and big business.

One of the highlights of the conference was a videotape of some material from a documentary on Armstrong that is being produced by Thomas Lewis, Professor of English at Skidmore College. The documentary, *Empire of the Air*, is planned for broadcast on PBS sometime this spring, and is filled with information and pictures that were not previously available to the public.

Many aspects of Major Armstrong's life were examined, from his origins to his invention of regeneration in 1912 as an undergraduate at Columbia; his World War One adventures, the invention of the superheterodyne in 1917 and the superregenerative circuit in 1922; his return to Columbia as professor and academic researcher; and the development of FM in the '30s. Also touched on were the lives of Lee DeForest, who pre-

vailed in the end over Armstrong in the regeneration patent suits, and David Sarnoff, the head of RCA. Sarnoff was considered a friend and much admired by Armstrong, but in later years allowed RCA to do as much as possible to hinder FM radio.

DeForest was described as the quintessential entrepreneur who for whatever reason decided that Fleming's "Valve" (a light bulb with a plate mounted over the filament, making it the first practical diode) needed a grid between the plate and the filament, and thereby discovered the triode. When he found out that his device was capable of amplifying audio, he named it the "Audion" and set out to sell it to AT&T for use in the telephone system. There was a problem with it, however.

If an Audion circuit was pushed to obtain more than a small amount of amplification, it would oscillate uncontrollably. This resulted in howling, making the circuit useless for telephone work. DeForest went back to his lab and tried everything he could think of to eliminate the howling, but had little success because he did not understand the principles behind his discovery.

Armstrong, then an undergraduate engineering student at Columbia, studied the Audion and did a series of experiments with it that enabled him to describe, for the

first time, how the Audion worked and how to calculate its behavior under various circumstances. He realized that the oscillations were the result of the output signal feeding back to the input, and he discovered that the audion could be used as a radio detector of unprecedented sensitivity if the feedback was limited to a point just before oscillation. He patented his circuit, which he called Regeneration, and sold it to Westinghouse. It rapidly became popular, earning fame and fortune for Armstrong. He also discovered how to tame the oscillations and make the audion serve as a generator of audio and radio frequency signals. This effect was covered in a second patent.

DeForest promptly filed a patent interference suit, claiming he had known about feedback all along. He produced lab notebooks that purported to show that he had created the effect several months before Armstrong applied for his patent. Initially, the courts sided with DeForest, even though his work was at audio frequencies without application to radio, and he was trying to eliminate feedback rather than control and make use of it. Armstrong won on appeal after doubts were raised about the validity of some of the entries in DeForest's notebook and DeForest could not explain how his inventions worked.

Armstrong's personality was one that could not let well enough alone. While that was one of his strong points in the laboratory, it proved disastrous in legal matters. DeForest could not pay the damages awarded by the court, and Armstrong's intransigence resulted in having the matter

dragged back into court. AT&T had by then bought the rights to DeForest's inventions, and subsequently transferred all the radio-related patents to RCA in the negotiations that followed the establishment of RCA in 1919 and gave AT&T an assured monopoly on wired communications. These negotiations also gave RCA control of the Westinghouse radio patents.

RCA decided to re-argue DeForest's claim to regeneration. The fact that Armstrong had taken out two patents on essentially the same effect created a loophole through which RCA's legal department managed to have DeForest declared the inventor of regeneration by the Supreme Court in 1924. The ruling, by the way, did not nullify Armstrong's patents; it became the first time in U.S. history that two men were issued patents for the same invention.

Armstrong and DeForest were battling for honor. RCA had a less lofty purpose. It still controlled regeneration regardless of which man won.

Armstrong's original patent was due to expire in 1931. But by having DeForest declared the inventor in 1924, RCA was able to "start the clock over," another first in U.S. patent history, and add another ten years to the life of the patent! It was estimated that RCA received millions of dollars in additional royalties as a result.

Something court records can not show was brought out by the panelists at the conference. This was the tremendous devastation the court battles had on both Armstrong and DeForest personally. Not only had another man been

declared the inventor of Armstrong's first, and at that time most important circuit, but RCA was responsible! Some of the panelists said they felt Armstrong never got over the loss, and it was this, coupled with the litigation he was forced into to protect his rights to FM in later years, that led to his suicide on January 31, 1954. DeForest, who was never honored for regeneration by any engineering society, simply dropped out of the technical end of radio.

The difficulties Major Armstrong faced in making FM broadcasting a reality were the main focus of the conference. The inspiration for FM was said to have come from Sarnoff, who in 1931 remarked that radio (meaning AM) was perfected except for interference, which could not be corrected. Armstrong set out to build a system that would be immune from this problem. Previous researchers had said that frequency modulation would never be satisfactory for broadcasting, but they had only studied narrow-band FM. Armstrong's approach was to use a wide bandwidth, and even then there were those who refused to believe it would work until it was demonstrated publicly in 1934. Much to Armstrong's consternation, Sarnoff refused to embrace FM because it would make much of RCA's huge investment in AM broadcasting redundant.

Believing he had a superior system, Armstrong spent a large part of the considerable fortune he had received from his earlier inventions to continue its development and get it into public useage.

In order to do this, he built his own FM station (the tower of which is

still visible from the Palisades Parkway in Alpine, New Jersey), and argued the case for FM in the courts and at the FCC.

The television industry, which had been gaining strength rapidly since Sarnoff's "Presentation of Television to the World" at the 1939 World's Fair, decided that FM was a nuisance because it would occupy spectrum space that could be used for TV. When the FCC decreed that FM was to be used for television sound, a number of companies, including RCA, refused to pay for Armstrong licenses, claiming there was nothing new about the technology. As "evidence," they cited the old narrow-band research that had concluded that FM was unsatisfactory! Armstrong was forced back into the courts, and the litigation (the last of which was finally resolved in favor of the Armstrong estate in 1967) is what broke Armstrong spiritually and financially.

Perhaps the saddest part of Armstrong's struggles was the reallocation in 1948 of the FM band from its original 50 MHz spot to its present assignment. Under intense lobbying from the AM broadcast industry and the television interests, the FCC moved the FM band and eliminated television's channel one, ostensibly to protect these services from atmospheric interference. That there was no evidence of such problems in that band of frequencies made little difference. Even RCA's Dr. Harold Beveridge, one of the foremost authorities on radio propagation at that time, had gone on record as saying there was no advantage to moving either FM or channel one.

There is little doubt the changes were made for political, not technical reasons; the FCC subsequently reassigned "one" to emergency communications! The move did not do much damage to television, as its remaining prewar channels were left intact; but overnight, 50 FM transmitters went off the air and 500,000 receivers were rendered obsolete. In addition to the band change, the new regulations also limited FM stations to lower power.

The proponents of this restriction claimed that it would create a local, community oriented radio service, but it also had the effect of making FM stations less viable and far less profitable than AM. It took Armstrong and the manufacturers involved with FM almost 18 months to redesign and retool for the new conditions.

A lively presentation was made on one aspect of the Armstrong story that has not yet had much coverage. By the late 1930s, FM was acknowledged to be technically superior to AM, yet its growth in the postwar years was sluggish. Some of the reasons cited included FM receivers that were anything but high fidelity, the lack of adequate network facilities, and the fact that many stations simulcasted the same programming on AM. It was difficult to manufacture affordable radios that worked reasonably well at 100 MHz with the technology that existed at the end of World War Two. Would-be broadcasters were reluctant to invest in stations for small audiences and consumers did not want to buy FM radios when there was little in the way of programming to tune into. Many were afraid to

invest in FM again after the band change.

The number of FM stations on the air declined from 1954 to 1957 and did not begin to climb again until 1958. By then the AM band was getting crowded, and relatively inexpensive German multiband radios, many of which were capable of good hi-fi performance, were on the market.

FM was also helped greatly by FCC-sanctioned stereo in 1963 and the elimination of simulcasting in 1967. It became the place for the "youth generation" to play its counter culture music, and other special interest broadcasters discovered it. Finally FM offered some things AM did not, and consumers responded.

A brief summary was made of the way things stand today. About ten years ago, FM finally caught up to, and surpassed AM in listeners. But it has turned into big business, replete with bottom-line managers, market share consultants, and a large amount of programming designed for maximum profit with little regard for cultural value. In many aspects it suffered the same fate as television, an irony that would not be lost on either Armstrong or Sarnoff.

Engineering, in the traditional sense, has gone out of radio broadcasting, and even the FCC nowadays seems less concerned with engineering than legal matters. FM will soon face a new challenge from what is being called digital radio, which promises higher fidelity in less bandwidth.

Of Armstrong's earlier inventions, the superheterodyne has most strongly influenced modern radio

design. It replaced the regenerative and superregenerative circuits and made the tuned-radio-frequency receiver obsolete. But perhaps one of Armstrong's least known legacies will eventually become one of his most lasting. In the early 1950s, he helped fund a study of the American patent system at Columbia University. One of the outcomes of this study was the establishment in 1982 of a Patent Court of Appeals, which now makes litigation of the sort he went through far less likely.

Many of the panelists had known and worked for Major Armstrong, and through them there developed an image of the man—rather unlike the cold, scientific, eccentric loner that has sometimes been our image of him. Although he was careful not to divulge information on his work before patenting it, he

was judged a brilliant lecturer by his students and peers at Columbia, and his papers were considered classics. He had a staff of approximately 30 people working for him on FM, and he was very loyal to all his friends and helpers.

His loyalties also extended to the companies that used his inventions and paid royalties on them, and even in the later years he was willing to deal with Sarnoff. He enjoyed his wealth; he always drove fancy cars and took exotic, adventurous vacations. While his early inspirations came from the 19th Century inventors, men who worked alone in their laboratories to develop marvelous things for civilization, often without thought of financial reward, he adapted and became a prototype for a new breed: the 20th Century academic researcher.

NEWS FROM WEST VIRGINIA

The big news is about our new West Virginia Chapter headquarters and Radio Museum in Huntington, West Virginia.

We have already moved some of our radios and display equipment into our approximately 10,000 sq. ft. building. The building can stand a lot of work, but is fairly presentable as is.

The West Virginia Chapter of ARCA plans to host four quarterly meets at the Museum each year beginning in 1992. We plan two meets this year, one on July 6th, and October 5th. We will have limited display and other preparations for our first meet, but we invite all ARCA members to attend and help make this a huge suc-

cess. If you have a folding chair, bring it along.

We have appealed to several local and regional businesses for contributions, and have already received some cash and material donations. Several companies have indicated they will help us this year. Without the help of our local community, and the support of ARCA membership this Museum can never be the historical and educational entity we hope it becomes.

ARCA members can help by joining our newly-formed Museum Foundation. For \$25.00 annually you will be entitled to a 15% discount on all purchases from the West Virginia Chapter Bookstore, free registration to all Chapter

Museum events, including auctions. Radio enthusiasts starting a library of hobby books could save the price of Museum membership on book discounts alone. For the sake of the radio collecting hobby, we urge all ARCA members to join our Museum Foundation.

The building is ideal for an antique radio museum. It is large enough to be useful, and not so big that we couldn't pay utilities, insurance, and other ongoing expenses. Many of the classrooms have been changed little since the 1930's, and are certainly appropriate for the display of items manufactured fifty to sixty years ago.

Until the Museum begins to fill up, there will be room to set up at least 45 flea market tables inside; not to worry about being rained out! The auditorium could seat over 200, if we had the seats.

The ARCA Museum is situated less than ten minutes' drive from the Huntington Museum of Art, and is about two minutes away from Huntington's 14th Street West, which has many antique and second hand shops. The Collis P. Huntington Railroad Historical Society has a display only two minutes away from our building. Their equipment includes a steam locomotive engine.

Our museum is located on Florence Ave. (1600 block), in the Harveytown section of Huntington's west side, and is near the West Huntington Interstate 64 exit #6. From Exit 6 off ramp, turn right on Madison Ave., turn right at first traffic light onto 14th St. West. Proceed about 1000 ft. to Railroad underpass, almost immediately you will see a steam locomotive on

the right, turn right onto Memorial Blvd. About 300 ft. later, turn left onto Harvey Road. After about one half mile, turn left at brown stone church. Three hundred feet ahead on the right, look for many smiling faces of HAPPY radio collectors.

Zane W. Parsons,
Reporter

EQUIPMENT-CONTEST WINNERS AWA Conference, September 1990

CLASS 1—Armstrong and Regeneration

First: Lauren Peckham, Equipment used by Armstrong

Second: Ross Smith, Superregenerator

Third: Peter Yanczer, Regenerator and amplifier

Special: Luther Schaeffer, Armstrong Blooper

Special: Andre Chompret, Radio Blocs

CLASS 2—Armstrong and the Superheterodyne

First: Tolbert Prowell, Houck prototype second-harmonic superhet

CLASS 3—Armstrong and FM

First: Bruce Kelley, First FM Network Broadcast

Second: Floyd Jury, Alpine Tower

CLASS 4—Armstrong, The Man

First: Floyd Jury, Life display

First: Mike Katzdorn, Armstrong papers

Second: Jerry and Marsha Simkin, Book display

Thirld: Ralph Williams, Armstrong honors

CLASS 5—Passive Receivers

First: James MacKinnon, Hunt & McCree, 1912

First: Robert Lozier, Western Electric Italiana

Second: Les Rayner, Hunt & McCree, 1904

Second: Scott McWilliam, Commerce Radiophone

Thirld: Will Jensby, Marconi type A

Thirld: Ron Frisbie; Kodel and vibrator

CLASS 6—Receivers, One- and Two-Tube

First: Robert Lozier, English Kolster

Second: David Cheney, Northern Electric

Thirld: John Wiesner, Grebe CR-8

CLASS 7—Receivers, Three-Tube

First: Jim Clark, Tecla

Second: Robert MacIntyre, Canadian GE 93

Thirld: Stephen Short, Kennedy V

CLASS 8—Receivers, Four- and Five-Tube

First: Ross Smith, Silver-Marshall

Second: David Peckham, Radio-dyne WC-5

Thirld: Ron Lawrence, Zenith 4R

Thirld: Clay Seidel, Franklin Treasure Chest

Special: H. K. Ruhl, Freed-Eisemann NR-405

CLASS 9—Receivers, Six Tube and More

First: Les Rayner, Norden-Hauck DX-5

Second: Ernie Hite, Radio Receptor

Thirld: Conrad Spivey, Marti

Thirld: Vernon Oehlke, Federal 61

Special: Billy Richardson, Haynes-Cockaday-Silver

CLASS 10—Spark Transmitters and Artifacts

First: Glen Fritz, Arc telephony

Class 11—Tube Transmitters

First: James Miller, 160-meter 1932

Second: Parker Heinemann, Collins 4A

Thirld: Edward Waite, 1928 push-pull

Thirld: Bob Mattson, Hartley

Special Display

Philip Taylor, Tuning-eye tubes

Display Award: Jerry and Marsha Simkin

Elle Craftsman Award: Lauren Peckham

Matlack Award: Bob Mattson

Eunice Thompson Award: Mike Katzdorn

Judges and Staff: Al Bennett, Geoff Bourne, John Caperton, Charles Days, Alan Douglas, Ruth Drake, Elinor Williams, Ralph Williams

MEL'S CORNER



Now and then collectors ask me—"What kinds of radio collections that you have seen—appeal to you the most???"

That's a pretty tough question—when you stop to think—as I have seen many over the years—Some of them large—and then others small—

In my case viewing a large collection of most everything you can imagine—I head for the very early gear—the items of most interest to me—most of the items being—before—1926—However I don't neglect carefully looking over—the progression and developments that occurred following that period of time.

Not being a youngster any more—the items that appeal to me are naturally the items that I *used*—and grew up with—in my early days.

I believe it's just the case of the various generations looking over equipment of their age group along the same lines. We all have our preferences—and that's what makes the world go around! I can look at a collector—and then have an idea of what he is about to show me—Hi! Sure—there will be a few early items in there—but does he really know the background of these early items?? That is what it takes—to search out the backgrounds in old books and early

magazines. The various radio meets is where you find all this information—

The large Museums have their special corners of interest. It is always interesting to see some of the older fellows flocking around the early equipment—telling many tales of their experiences with this and that item of equipment. When they walk around—here comes the collection of "Ham" gear—

That becomes a mixture of the older fellows as well as the younger Hams—present active operators—who want to know what early equipment was all about??? Much of it evolves around what these newer items do today in their compact environment! Those large panels of equipment—with large meters now relegated to small spaces—the big OT coils and condensers—pardon me—"Capacitors" hi!—now packed into small spaces—Efficiency in the progression!! This early form of transmitters were mainly breadboarded parts—a lot home made!!

Next comes—no end of the various broadcast receivers!! Some of them cluttered the house—with all their necessary equipment!! It was then that the ladies took over—so radios could be used and heard in the living rooms! At first it was a table set with a horn speaker—not exactly the answer to decor? With the arrival of beautiful console floor sets—Radio became a must!! Manufacturers realized that beautiful cabinets with all their fancy flourishes—were the order of the day!! Eventually—all these beautiful consoles wound up with the trash men!! Now it becomes a question how well the radio will fit into a book shelf!

Remember the days when you bought a radio—the salesman would display those connections inside—where to show you where to hook up a Television set—when they become available?? Farnsworth radio sold many sets on this feature.

It was not too many years ago—when some collectors ran across early TV receivers—and decided to bring them back to life! Not a simple under-taking! Today we have any number of TV collectors involved in that category! The surprising thing was the sudden burst of collectors involved with early transistor radios!! Plastics became alive! Especially the art deco items and those rare forms of the Catlins!! Time moves on—what next???

We often look at the early developments of Marconi—who made a practical use of communications—with his development of the coherer. Long before Marconi's time—other scientist's such as Prof. Branley—and others—were coming up with bits and pieces of experiments with minerals and gases—that produced strange

results—to their minds?? Marconi became aware of this which led him to further investigations—and the eventual development of a working coherer.

Today—we are involved with a War using the most complex use in electronics!! Far beyond the imagination of most of us!! Radar guidance technology and modern communications systems—have reached a peak in our imaginations as to what the future years will develop?????

As we sit here looking at our crystal detectors and coherer—It becomes apparent—how all the developments over the years—started these fantastic electronics technologies—We antique collectors want to know—how things began!! We look for the artifacts of equipment and related tools that were used at the beginnings—Our collections and Museums establish the actual facts and information—for the use of posterity—It's a great hobby of value to be associated with!!!

Cheerio!!
Mel

December 20th, 1990

Antique Radio Club of America
4204 Thorn Apple Lane
Charleston, West Virginia
Mr. Lloyd McIntyre—President

Dear Lloyd:

Having served for a number of years on the board of directors of our organization—I believe it is about time for me to retire from this post—and turn this over to more younger capable hands.

Our club has grown many times over since it's inception and will continue to grow under the format you have laid for it!!

Therefore—I hereby tender my resignation to the board of directors—and will continue my membership and support as best I can with my usual articles known as "MEL'S CORNER" in the Gazette.

I want to wish you and your family a most happy Holiday Season with lots of goodies and joy!!!!

MERRY CHRISTMAS!!!!

Mel Comer

Ye Old SW SHOP

Eico VTVM, 232 \$25.00; WD-11 Duds \$10.00 ea.; 199 tubes \$15.00 ea.; plus much more! Radios, tubes, parts, etc. Send SASE for list. Also two Zenith transoceanic's tube type. All above are tube type units.

Louis J. Takacs
3402 Orchard St..
McKeesport, PA 15132

WANTED: AK model 82 chassis and speaker; black or brown 3 tube TA unit; model 10 A RF coils (tags but no binding posts); early vacuum tube unit with binding posts; detector amp (can only with tag); I have a mounted varcoupler for trade. Also need information on 1917 Premier xmtr. and 1917 Johnson & Phillips Mark III tuner (Marconi).

Larry DiBarry
212 North 6th St.
Chambersburg, PA 17201
(412) 263-3804

WANTED: Dial Glass for RCA Victor Model A-20 "Globe Trotter"; Empty Floor Model Cabinets for Model H-31 RCA and A-8 RCA, must have solid veneer and in good shape; Dial for Model R-31 RCA; Webcor Record Player for RCA Model V-302; Need Knobs and Push Buttons for 1941 Crosley Model 22-CB.

The Old Tyme Radio Centre
RR #3 Walkerton
Ont. Canada NOG2VO
Phone: 519-881-0249

FOR SALE: Old radios, accessories, and instruments circa 1920-40. SASE for list.

Hank DeQuasie
P. O. Box 356
Limon, CO 80828

WANTED: A clean matching separate speaker for my near mint National NC-125 Communications Receiver.

Ken Greenberg
4858 Lee
Skokie, IL 60077
Phone: 708-679-8641

FOR SALE: Halicrafter ham sw/radio, S-20-R \$80.00; Halicrafter ham sw/radio, 8-R-40 \$150.00; Hammarlund ham sw/radio, HQ-100 \$95.00; Bell audio amp. 40 wt. 4 input \$65.00; Bendix table bakelite radio \$40.00; Eico deluxe FM tuner, FHT-90 \$40.00; Eico signal generator 315 \$25.00; Heathkit deluxe preamp. WA-P2 \$40.00;

WANTED: Any information on Military Surplus Tube Checker, TV 4A/U Tech Manual Preferred.

Itsuo Yano
80 Lehua St.
Kahului, HI 96732

WANTED: Set of Fourteen (14) Push Buttons for 1946 Scott 800-B (F.O.S. Pg. 169), Part #10B735, Clear Plastic, 11/16" sq. w/slot for sta. tab.

Charlie Mooney
12 Garden Lane
Hanover, PA 17331
Phone: 717-633-9612

WANTED: Pre 1929 Buffalo, NY Radio; Aragain, Branston, Federal, King, Larkin, USL, Wurlitzer Radio Sets, Speakers, Catalogs, Tubes, Parts, Misc. Silvertone and Adler-Royal, (By King). Need **USL** #UA6 'Broadcast Receptor' and any **Branston** Models.

Joseph M. Pawell
6 Augustine Ave.
Ardsley, NY 10502
Phone: 914-693-9374

WANTED: In restoring my Grebe CR-18, I will need the coils for it? If I just had one to go by I could make them! Some generous collector may help?? Also have a Collins 32V-3 RCVR—Where I need a dial glass and a low voltage transformer. Swap items??—Just Alligators Down Here—Hi! Wes Chatellier—W5DPM
1950 Chevelle Drive
Baton Rouge, LA 70806

WANTED: Copy of owner's manual and/or schematic for B & K Model 606 Dyna Jet Tube Tester; Heathkit Capaci-Tester Model CT-1 and Simpson VOM Model

260, Series 6-P.
Carlos Martinez
21 Colonel Lrizarry Street
Cayey, PR. 00633

WANTED: Issues of Television (1928-1929); Television News (1931-1933); Citizen Radio Call-books (1925-1931); and Radio Age (late 1920's). Will purchase outright or have other magazines to trade.

Jim Clark
1292 Starboard
Okemos, MI 48864
Phone: 517-349-2249

NEW BOOK! FIXING UP NICE OLD RADIOS! by Ed Romney an old radio instructor. 186 p. 300 illustrations and schematics. \$19 plus \$1.50 ship. Visa/MC ok.
ROMNEY

Box 96
Emlenton, PA 16373
(412) 867-0314

SWAP: Have very early radio apparatus loading coil—a very fine item—need the two RF Westinghouse units for my RADA. Have a restored Acmeflex RCUR and other items available. Interested in early equipment mainly.

Tod Prowell
1073-15 Lancaster Blvd.
Mechanicsburg, PA 17055

WANTED: Case for Fada 5 Tube Neutrodyne with Sloping front panel, as shown in Greenwood's Vintage Radio (3rd Edition), page 124, Model 175-A. Also shown in Alan Douglas' Radio Manufacturers of 1920's, Vol. I, page 198, Model 192-A. If you can supply one, please write stating condition and price.

Anton Fitz-Gerald
83 Highfield Lane
Southampton, SO21NN., U.K.

NOTICE: VINTAGE TV & RADIO MOVES TO LARGER QUARTERS

Vintage TV & Radio has moved to larger quarters at 3498 West 105th Street, Cleveland, Ohio 44111.

The new location will provide space for the increasing number of new-old-stock radio and tv parts, reproduction items, books, everything for the collector.

Although primarily a mail order establishment, Vintage TV & Radio will continue to have a showroom, open by appointment, with vintage radios, televisions and related items for sale.

A catalog offering over 35,000 tubes, specialized refinishing supplies, reproduction knobs, books and numerous new-old-stock parts are available.

FOR MORE INFORMATION:

Dan & Pat Szablewski
Vintage TV & Radio
3498 West 105th Street
Cleveland, Ohio 44111
Phone: 216-671-6712

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